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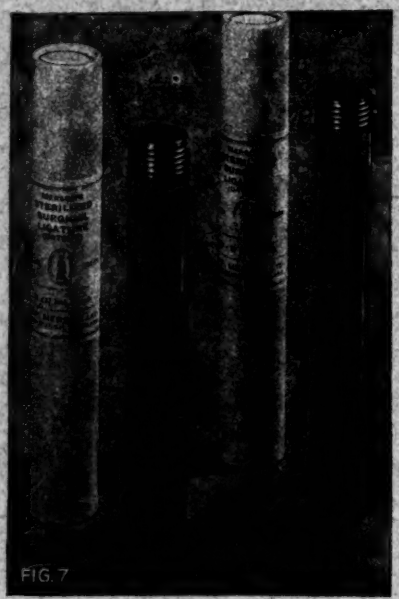

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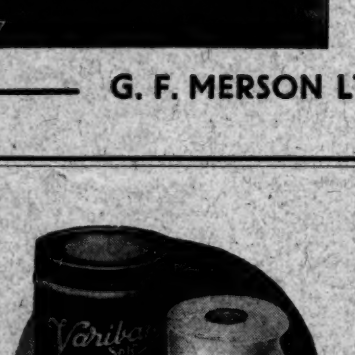

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY AUGUST 30 1941

CLINICAL OBSERVATIONS ON AIR-RAID CASUALTIES

BY

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The following paper contains the substance of a report prepared for the Medical Research Council's Committee on Traumatic Shock. It is based on 100 cases, 41 of them from the series observed at this hospital and 59* from case records supplied to us by the committee. Observations have not been confined to air-raid casualties, but have also been made on other cases of injury. Accident cases display the same varied features as air-raid casualties; they have the advantage that their observation is easier, since they are not as a rule admitted in large numbers in a short time and since the disturbing features of a bomb attack are absent. We have omitted cases of the so-called crush syndrome and of severe burns, which are being dealt with by others.

With these exceptions, and according to our own experience of many more cases than are here dealt with, this series illustrates the variety of the general reactions to injury shown by air-raid casualties and accident cases. The series, however, is not a random sample. The case reports received from the Committee on Traumatic Shock record for the most part examples of multiple and severe injuries associated with a low blood pressure and receiving transfusion for resuscitation. Our own cases were chosen in the first instance from those described by our colleagues as being "shocked" on admission, and later because they presented features of interest apart from a diagnosis of "shock," though this was applied to the great majority.

General Features

Some of the general features of the cases are summarized in the accompanying table. They are divided into three main groups, according to the level of systolic blood pressure when they first came under observation: in most cases this happened within a short time after admission to hospital; in few was it delayed more than an hour. The groups are those with (I) a raised systolic pressure, over 140 mm. Hg (9 cases); (II) normal pressure, 100 to 140 (28 cases); and (III) low pressure, under 100 (63 cases). The group with low pressure is subdivided according to the initial pulse rate: (A) slow, under 70 beats a minute (9 cases); (B) moderate, 70 to 100 (27 cases); and (C) rapid, over 100 (27 cases). It will be seen that this classification, originally adopted for convenience, serves to separate the cases into groups differing in certain other respects also; but we regard it as provisional only, and seek a better.

Table showing General Features of the Cases

		I.	II	IIIA	IIIB	IIIC	
				Low Blood Pressure (under 100 mm. Hg)			
		Raised Blood Pressure (over 140 mm. Hg.)	Normal Blood Pressure (100 to 140 mm. Hg.)	Slow Pulse (under 70 per min.)	Moderate Pulse (70 to 100 per min.)	Rapid Pulse (over 100 per min.)	
	Totals	9	28	9	27	27	Total
Age in years	10 to 19	–	6	–	3	3	12
	20 to 29	3	6	1	3	9	22
	30 to 39	1	7	1	3	7	19
	40 to 49	1	5	–	3	5	14
	50 to 59	3	2	2	6	1	14
	60 and over	1	2	5	9	2	19
Time seen after injury	Within 1 hour	5	12	2	8	4	31
	,, 2 hours	2	8	5	9	9	33
	,, 4 ,,	2	4	2	5	7	20
	,, 6 ,,	–	3	–	3	3	9
	,, 8 ,,	–	–	–	1	2	3
	Longer	–	–	–	–	1	1
	Unstated	–	1	–	1	1	3
Injuries	Minor (No internal)	2	–	2	1	–	5
	Moderate (No internal)	3	9	1	4	–	17
	Severe (No internal)	4	14	1	11	11	41
	Internal	–	5	5	11	16	37
Haemorrhage	Little or none	7	3	2	3	–	15
	Moderate	1	3	1	5	2	12
	Severe	1	18	6	17	22	64
	Unknown	–	4	–	2	3	9
Survival so far as known	At least 24 hours	2	–	3	2	3	10
	,, 48 ,,	–	3	1	–	2	6
	,, 72 ,,	–	–	–	1	1	2
	3 days or more	7	18	1	9	3	38
Deaths	Within 24 hours	–	2	2	10	13	27
	,, 48 ,,	–	3	2	2	4	11
	,, 72 ,,	–	–	–	2	1	3
	After 3 days or more	–	2	–	1	–	3

It will be seen that this classification, originally adopted for convenience, serves to separate the cases into groups differing in certain other respects also; but we regard it as provisional only, and seek a better.

The series includes persons of all ages from 8 to 71, 30 being females. About one-third of them are under 30 and one-third over 50. It is of interest to note that of the 37 patients with initially raised or normal pressure (Groups I and II) only 8 (22%) are aged 50 and over, while they number 25 (40%) of the 63 cases with low pressures (Group III). Again, of those with low pressures, 7 of the 9 with slow pulses (Group IIIA) are aged 50 and over, but only 3 of the 27 with pulse rates over 100 are of this age (Group IIIC). These findings suggest that in injured subjects the

* For these records thanks are due to:

Army Blood Transfusion Service, 19 cases
Dr. Helen Brown, N.W. London Blood Supply Depot, 8 cases
Dr. J. McMichael, British Postgraduate Medical School, 7 cases
Dr. James Dow, St. George's Hospital, 5 cases
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Dr. T. S. Gavey, Westminster Hospital, 4 cases
Dr. R. F. Ball, Royal Free Hospital, 2 cases
Prof. W. Wilson, Aberdeen University, 2 cases
Mr. J. Ledingham (student), Hackney Hospital, 2 cases
Dr. G. A. R. Miles, St. Thomas's Hospital, 1 case
Dr. J. K. Denham, Western Fever Hospital, 1 case
Dr. R. D. Blachford, Charing Cross Hospital, 1 case
Dr. C. Wilson, Billericay Hospital, 1 case
Dr. E. E. Pochin, University College Hospital, 1 case

Thanks are also due to all those at our own and other hospitals whose co-operation made these observations possible.

blood pressure is better maintained, but the pulse rate tends to be faster in the younger than in the older. The series, however, is too small to allow of a close analysis of this and other factors which might influence blood pressure and pulse rate, such as (*a*) time of coming under observation after injury, (*b*) the severity of the injury, and (*c*) the amount of blood lost. A word may be said about each of these factors.

(*a*) The majority of cases (64) came under observation within two hours of injury—31 within one hour and 33 between one and two hours. The groups differ to some extent in this respect, the interval between injury and observation tending to increase in passing from Group I to Group IIIC. This suggests that the longer the interval the more likely is the blood pressure to be low and the pulse rate fast.

(*b*) An attempt has been made roughly to classify the injuries, which in most cases were multiple. Those with evidence of internal injury (to contents of skull, thorax, and abdomen) are tabulated separately (37 cases). Of the others, those with small cuts, bruises, and abrasions are tabulated as minor injuries (5 cases); those with simple fractures and flesh wounds with little laceration of the soft parts are tabulated as moderate (17 cases), the remainder as severe (41 cases). The series is too small to allow of a finer subdivision, and for this purpose it is clear that many more cases are required. Nevertheless, this rough classification displays differences between the groups. None in Group I sustained internal injuries; the proportion in Group II is only 5 out of 28, while it rises to 16 of 27 in Group IIIC. Also, the proportion of cases classified as having injuries only minor or moderate in degree decreases in passing from Group I to Group III, Group IIIC containing none.

(*c*) We have tried also to group the cases according to the degree of haemorrhage—as little or none, moderate, and severe (probable loss of more than two pints of blood, haemoglobin falling below 75%). As a basis we have accepted the observer's estimate when this is recorded, combined with such information as there is of the state of the dressings, the presence or absence of a tourniquet, the reduction of haemoglobin, and in a few cases the estimation of blood volume by the plasma-dilution method. Estimations of the haemoglobin content of the blood at some time during the course are recorded in 64 cases and data for estimation of the blood volume in 18. In 9 instances data are not sufficient to allow any estimate of blood loss. It is to be emphasized that such estimates of blood loss may not be reliable. Accepting them, however, as the best available, the table shows that at least 64 of the 100 cases suffered a severe loss of blood. The degree of haemorrhage is least in Group I, this being assessed as severe in only one of nine cases. The high proportion of those suffering much loss of blood in Group III (45 of 63) is perhaps not unexpected, but the equally high proportion in Group II (18 of 28) is noteworthy.

The haemoglobin content of the blood was estimated soon after observation began and before transfusion in 45 cases. It was abnormally high (128%) in one only, and this case should probably be classified as an example of crush injury. In only one other did the percentage concentration reach 120 (Haldane's scale), while in 6 it lay between 110 and 119 and in 6 also between 100 and 109. There is therefore little evidence of concentration of the blood in these patients, though it is to be remembered that the state of the blood before wounding is unknown. On the other hand, the haemoglobin content was less than 80% in 16 cases; it was between 50% and 60% when estimated about two hours after injury in 3 cases and 45% in a fourth case four and a half hours after injury. The majority of these 45 cases are classified as having sustained severe blood loss; if this assessment is correct then there is considerable individual variation in the rate of dilution of the blood after haemorrhage, and the estimation of haemoglobin within an hour or two of an injury may give no indication of the amount of blood lost.

The data on such symptoms as pallor, cyanosis, coldness, sweating, thirst, nausea, and vomiting are too meagre to allow a close comparison between the groups. It is to be remembered that many of the patients are very dirty and their faces and hands so smeared with blood and dust that skin colour is obscured. Even when the skin is clean cyanosis is not readily observable in artificial light, often dim because of the black-out. Thirst in many instances can be attributed to dust in the mouth. From the information given, however, the majority of patients in all the groups have cold extremities. Pallor is the rule in Group III, but in Groups I and II a considerable proportion are of a good colour. Sweating is frequent, but less so in Groups I and II than in Group III. Nausea and vomiting are recorded in only about one-quarter of the cases, the proportion being highest in Group IIIA. Approximately half the patients in each group are stated to be in pain; only 5 are said to have no pain. The majority are described as mentally clear, a few as dull, drowsy, comatose, or unconscious, but only 4 are said to be apathetic. Indeed, one of the remarkable features of these cases as a whole is the entire consciousness and what might be described as mental alertness tinged with anxiety, even with severe and rapidly fatal injuries and though the pulse and blood pressure are unrecordable. For example, a woman aged 40 was buried for eighteen hours in a doubled-up position, sustaining severe bruising, a fracture of the pelvis, and injuries to the lungs, in which extensive haemorrhage was found at necropsy. She died about four hours after admission to hospital. During this time her radial pulse could not be felt, nor could her blood pressure be measured. The carotid pulse was barely palpable, very soft, and thin; it varied with respiration, disappearing at the end of inspiration and reappearing with expiration. Her extremities were cold. The observer states that though there were all the signs of a very bad circulation she was remarkably conscious. When asked questions she gave reasonable replies, but with a short latent interval as if she were very tired. She told her name, age, etc., described the bombing, said it had been a very horrible experience, wanted to know if she was going to die, and was anxious not to be a bother to the nurses and doctors. When her feet were washed in hot water she complained that it was too hot; ten minutes before death she said that the pressure of the sphygmomanometer cuff hurt her arm.

Group I (Raised Blood Pressure)

The 9 cases included in this group are of two types. The first comprises those in which injury has occurred in already hypertensive subjects. These need not be considered further, but they require to be borne in mind: the good colour, strong pulse, and raised pressure may mislead by giving a false impression of the patient's state. If the wounds are severe and blood has been lost collapse is likely to occur sooner or later, but is often prevented by early transfusion.

In the second type the rise of pressure seems to be a reaction to injury in previously normal subjects. These patients are younger than those of the first type and the majority are pale; the pulse rates on admission range from 64 to 92 per minute. It is to be noted that though the blood pressure is raised the radial pulse may be small. The injuries vary from multiple minor wounds with little or no bleeding to severe wounds and haemorrhage. In some, blood pressure falls to normal levels in a few hours, but in others it remains high for at least one or two days. Pallor may persist or give way to a normal facial colour even though blood pressure remains high. All these cases were treated with rest, warmth, and morphine; only one (with severe haemorrhage) received in addition a transfusion of two and a half pints of blood. All underwent operation without collapse and all survived so far as is known. The following case exemplifies this type.

A man aged 23 was standing by the kerb when he felt giddy and fell; his leg was caught by the wheel of a passing van.

He sustained a compound fracture of the lower end of the right tibia and fibula; there was little crushing of the soft tissues or bleeding, and the skin wound was small. A sheet-metal worker by trade, he had recently been in the Army, but was discharged as unsuitable; he was instructed to return to his trade, but had not yet done so, complaining of headaches and attacks of giddiness, for which he was attending a neighbouring hospital as an out-patient. A telephone message to that hospital elicited the information that on that morning his blood pressure was 130/90. He seemed to be of a nervous temperament, and said that he and his young lady had been very nervous since a recent air raid. He admitted to smoking thirty to fifty cigarettes a day.

On admission less than half an hour after injury he was pale, mentally clear but anxious, cold, and shivering, and was suffering considerable pain. He was not sweating. His radial pulse was barely palpable, small, and hard, its rate being 64 a minute; his blood pressure was 180/95, and the respirations 16 a minute. He was partly undressed, given 1/4 grain of morphine, and put to bed under an electric cradle, a back splint being applied to the leg. An hour after admission he was warm and flushed. The blood pressure remained at the same level and the pulse small, though its rate increased to 78. He desired but was unable to pass urine. During the next hour the blood pressure fell, to remain at 145/80, the pulse became fuller, and its rate varied between 68 and 85 a minute. He was given 1/100 grain of atropine before operation, which was done two hours after admission, under pentothal, gas-oxygen, and ether, and lasted half an hour. Operation consisted in excising the skin wound, reducing the fracture, and applying a plaster bandage. Little blood was lost. During operation his condition remained good and the blood pressure stayed at about 145/90. A respiratory variation of about 10 mm. in systolic blood pressure developed, the pressure falling with inspiration and rising with expiration. This disappeared on recovery from the anaesthetic.

For an hour after operation he was restless and complained of pain; 1/4 grain of morphine was given, and he became quieter. He first passed urine—acid, of specific gravity 1014—seven hours after admission; it contained a trace of albumin and a few red cells, but no sugar, pus cells, or casts. The blood pressure again rose, and eight and a half hours after admission was 160/95, the pulse rate being 78, the respirations 20, and the mouth temperature 101.2° F. For continuing pain in the leg a third injection of morphine (1/4 grain) was given during the night. He passed urine several times, but no detailed observations were made. A specimen of urine passed the following morning about nineteen hours after admission contained a faint trace of albumin, but no sugar, red cells, pus cells, or casts; its specific gravity was 1014 and its *p*H 5.4. He was evacuated twenty-four hours after admission to a sector hospital, his blood pressure being 155/110, the pulse rate 76, respirations 20, and mouth temperature 98.8° F. Little is known of his further course, except that the following day the urine was reported to contain no albumin, sugar, or blood. A week later the blood pressure was 120/80 and the pulse rate 74.

Group II (Normal Blood Pressure)

Group II, consisting of 28 cases, is of special interest. It should be realized, however, that it is not a representative sample of the injured admitted to hospital with a normal blood pressure, for the majority of the latter are not severely wounded, have not lost much blood, and do not require transfusion. It represents rather those who in spite of severe injury and haemorrhage yet have blood pressures within normal limits. Such cases are not uncommon. This group emphasizes that a normal blood pressure and pulse rate and even a good facial colour are compatible not only with severe injury but also with much loss of blood. This was so in at least 10 of the cases. In the majority the pulse rate lay initially between 70 and 100 a minute; in few was it slower or faster.

All the patients were treated initially with rest, warmth, and morphine, but only 6 did not finally receive transfusion. These six were not very severely injured and their blood loss was not severe. Except for a temporary fall of blood pressure to about 90 mm. at operation in 3 of them, the condition of all remained satisfactory and, so far as is known, all survived.

In 13 cases blood pressure fell considerably and pulse rates rose after periods varying from about half an hour to four hours. In most this collapse occurred before operation; in a few it was delayed until during or after it. Transfusion was then given, being followed by a more or less rapid improvement, which was maintained throughout operation and later, except in 3 cases. In these three renewed bleeding caused another fall of blood pressure, which was restored by further transfusion.

In contrast to these are 9 cases in which transfusion was started soon after admission although blood pressure had not fallen below 100 mm. The condition remained satisfactory throughout except in two, which deteriorated following renewed bleeding at operation, though both recovered with further transfusion. This group of cases contains few that progress satisfactorily and undergo operation without transfusion: early transfusion in most cases prevents later collapse. It follows that in assessing the gravity of the condition emphasis should be placed on the severity of the injury and loss of blood rather than on blood pressure. In any case that is severely injured and suspected of considerable blood loss, transfusion should be begun at an early stage. The following case is representative of this group.

A tall well-built lad of 18, as a result of a bomb explosion, sustained multiple severe injuries of the legs and thighs, with much laceration of the muscles and a compound comminuted fracture of the left tibia. His clothes were soaked with blood. He was admitted to hospital half an hour after injury, was given 1/3 grain of morphine, and came under observation half an hour later. He was lying on a metal stretcher placed on the bed. His clothes were cut down the front, the wounds examined, and an electric cradle placed over him. His colour was good; he was warm and not sweating. Though he did not remember what had happened he was mentally clear, and recognized and talked with a mate in a neighbouring bed. His blood pressure was 120/70 and the pulse rate 94. Early operation was advised, and, because of the severity of the wounds and loss of blood and the probability that operation would be long, transfusion was begun one and a half hours after admission. His condition was still good, though he had become a little restless; the blood pressure had risen to 140/70 and the pulse rate to about 100. One bottle of plasma was given in fifteen minutes. Haemoglobin immediately before this was found to be 50% (by photo-electric photometer); second and third samples taken immediately and four minutes after giving the plasma showed the haemoglobin reduced to 43%. From this, blood volume was estimated at 3¼ litres. A second bottle of plasma was started. At this time he became pale and complained of cold, though he did not shiver; blood pressure rose to 180/80 and the pulse to 124. Blood began to ooze from the wounds, and the bandages were tightened. The reaction to transfusion soon subsided, blood pressure falling to 140/75 and the pulse to 100. He was given 1/100 grain of atropine, and was lifted from his cut clothes and taken to operation, the plasma transfusion continuing at a slow-drip rate. His condition remained good during operation, the only untoward event being the vomiting of at least a pint of partly digested food, which filled the anaesthetic mask and was perhaps partly inhaled by the patient. Blood pressure remained between 120/60 and 165/75, varying with respiration, the pressure rising with expiration and falling with inspiration. The pulse remained between 120 and 150. The wounds were excised and packed, and plasters were applied to both legs. Two surgeons dealt with the wounds in order to shorten the operation, which nevertheless lasted for one and a quarter hours, but was carried out with very little blood loss. Because of the low haemoglobin and reduced blood volume, two pints of blood were given in the two hours following operation. He then seemed in excellent condition. His colour was good and he was sleeping quietly, blood pressure being 150/80, pulse 124, and respirations 21.

The further unexpected course of this case is also of interest (see second part of paper, under "Deaths"). Six hours later (about twelve hours after admission) the patient was found to be flushed and a little cyanosed, rather restless, and semi-comatose. Blood pressure was 100/35, pulse 180, and respirations 40. Examination revealed dullness of the right chest, and radiographs showed a patchy consolidation of the right lung. His condition did not improve and he became delirious. Crepitus was detected in the muscles of the right thigh, and gas infection was suspected. A second operation was attempted nineteen hours after admission, but he died while the anaesthetic was being administered. No gas infection was found. Necropsy and subsequent histological examination revealed congestion and oedema of the lungs and early bronchopneumonia. Fat emboli (not very numerous) were discovered in the lungs, but not in the brain or kidneys.

Group IIIA (Low Blood Pressure, Slow Pulse)

This group comprises 9 patients, of whom 7 are aged over 50. In 2 the injuries were slight and accompanied by little blood loss; 5 sustained internal injuries; blood loss was severe in 6. All were pale; nausea and vomiting are recorded in 5 and sweating in 3.

All were treated initially with rest, warmth, and morphine. Of the two with minor injuries one improved rapidly when the foot of the bed was raised, the other more slowly; both underwent operation and progressed satisfactorily without transfusion. The two younger patients, both with abdominal injuries, improved during the observational period of one to two hours, blood pressure rising to 100 mm. and the pulse rate to between 70 and 90; both, however, collapsed—one at and the other immediately after operation—and each received blood transfusion with benefit.

The remaining 5 patients showed no improvement, and transfusion was given. In 4 the general condition rapidly improved, the blood pressure rising to over 100 mm. All underwent operation: one died on the table as the result of a severe blood loss; the others remained in good condition and progressed satisfactorily. The last patient showed only a temporary slight response to transfusion, and died about five hours after admission while blood was being given. In all the cases the pulse rate rose, but, except in the younger subjects, did not go beyond 100 beats per minute. The following two histories are given as examples of this group.

A woman aged 60 was buried for a short time under debris and sustained a small laceration of the scalp, some bruising of the left forearm, and a crushed left fifth toe. Bleeding had apparently been slight. She was admitted to hospital an hour after the bomb explosion and was said to be suffering from severe shock. She was given 1/4 grain of morphine and sent to the resuscitation ward. She was extremely pale and cold, was sweating and nauseated, but quite conscious. The radial pulse was barely palpable; the carotid rate was 40 a minute. Systolic blood pressure was about 60 mm.; the diastolic was unobtainable. Watched for some time, she did not improve; then the foot of the bed was raised, whereupon her condition improved immediately. Five minutes later sweating had ceased, and she felt much better; the pulse was stronger, and its rate 56; blood pressure was 90/65. After three minutes more the pulse was of good volume and 64 a minute, and the blood pressure 100/65; she remained pale. During the next hour her condition was good, though she still had bouts of nausea. She was then given 1/100 grain of atropine. Operation was proceeded with, the fifth toe being amputated and the scalp wound excised and sutured; little blood was lost. Her condition remained good. Five hours after operation she felt "pretty well" except for occasional nausea. She remained extremely pale; the haemoglobin was 106%, the pulse rate 72, and the blood pressure 165/80. The following morning, twenty-four hours after admission, she looked and felt well; the facial colour was good, the pulse 88, and the blood pressure 145/80. She was then evacuated to a sector hospital.

A man aged 38 was admitted to hospital half an hour after injury by an exploding bomb. His injuries were a perforating wound on the left side of the abdomen and a small incised non-penetrating wound of the lower right chest. He was pale, nauseated, and thirsty, but not sweating; his extremities were cold. Blood pressure measured 80/40 and the pulse rate 64. He was given 1/4 grain of morphine, was undressed, and was warmed by an electric cradle. The foot of the bed was not raised. During the next hour he gradually improved, becoming warm but remaining thirsty and nauseated. Blood pressure rose to 110/65 and the pulse rate to 76, haemoglobin being 112%. After 1/100 grain of atropine had been given operation was carried out under gas-oxygen and ether anaesthesia one and a half hours after admission, and lasted one hour. Laparotomy revealed blood in the peritoneum (measured to be about one and a half pints), a single perforation in the descending colon and three in the upper jejunum, and a tear in the mesentery. The gut was sutured. During operation his condition remained good except that the pulse rate rose to 124; the blood pressure remained at 110/50. Occasional extrasystoles also appeared and a respiratory variation in the blood pressure developed, the pressure rising with expiration and falling with inspiration. Just before he left the theatre his blood pressure was 110/50 and pulse 120; in the ward a quarter of an hour later the pulse had fallen to 104 and was hardly palpable; the systolic blood pressure was 60, the diastolic being unobtainable. Haemoglobin was still 112%. Raising the foot of the bed caused no improvement, and one pint of blood was transfused over thirty minutes; the blood pressure was then 100/65 and the pulse rate 94. A quarter of an hour later blood pressure had risen to 110/65, the pulse rate being 90 and the respirations 20; he slept quietly. His condition remained good throughout the following day, but it deteriorated rapidly next morning. No detailed observations were made, but he became very pale and the pulse feeble. A plasma transfusion was given, but the patient did not respond, and he died while a second bottle of plasma was being given, about thirty-six hours after admission. No adequate explanation for the collapse and death was discovered at necropsy. The state of the abdomen was satisfactory; the repaired perforations were healing and peritonitis was absent. The lungs were congested, and microscopical examination showed small foci of early bronchopneumonia. No fat emboli were discovered in sections of the lungs, brain, or kidney.

Group IIIB (Low Blood Pressure, Moderate Pulse)

This, like the preceding group, contains a high proportion of older people, 15 of the 27 being over 50, including 9 over 60. The majority were severely injured or had sustained internal injuries; the majority also suffered severe blood loss. Most were pale; sweating, nausea, and vomiting are recorded in about one-third. Only one is stated to be apathetic; 12 are said to be mentally clear.

In this group also all the cases were treated initially with rest, warmth, and morphine, but only one was not transfused. In this case (with moderate injuries and little blood loss) initial improvement on raising the foot of the bed was followed by deterioration, and later gradual recovery when fluids were given by the rectum; transfusion would probably have hastened his resuscitation. Another patient improved rapidly, but collapsed during operation, recovering when transfusion was given. A third case was operated on shortly after admission and before the blood pressure had risen from its initial level of 80/66; improvement rapidly followed transfusion after operation.

Fifteen cases showing no recovery after periods of observation of from two to three hours then received transfusion; only one failed to respond, dying shortly. Eleven underwent operation, 6 maintaining their condition then and subsequently, and 3 collapsing but being revived by further transfusion; 2 died on the table.

Nine patients received transfusion without any period of waiting. All except one, who soon died, were benefited and underwent operation; six required further transfusion

during operation, and one died on the table. The following case is typical.

A moderate-sized, lean, and "tough" man of 40 years was admitted to hospital forty minutes after injury by an exploding bomb. His left leg had been severed through the knee and the right severely lacerated, with a gross compound fracture of the tibia and fibula. No tourniquets had been applied, and from information received later it appears that much blood was lost. He was very pale, was not sweating, and was restless and in great pain, but mentally clear; the blood pressure was 85/50 and the pulse rate 84. Morphine 1/4 grain was given. He was not undressed; the foot of the bed was raised and an electric cradle applied. One pint of plasma was given in ten minutes, followed by one pint of blood in fifteen minutes. Meanwhile for continuing severe pain and restlessness 1/6 grain of morphine was administered intravenously; the pain passed quickly and for a time he became quieter and felt better. The blood pressure had risen to 104/56 and the pulse to 100; a second pint of blood was given slowly (over one and three-quarter hours). During this time he became warm and the blood pressure rose to remain at about 116/78, and the pulse rate fell to 80. Pain returned. Operation (lasting only forty minutes) was begun two hours after admission, his clothes being cut off after he was anaesthetized (gas-oxygen and ether). Two surgeons amputated the left leg through the thigh and the right through the knee. About a pint and a half of blood was lost. One and a half pints of blood were transfused during the operation. Following disarticulation of the knee-joint his extremities became cold and clammy; the blood pressure fell to 98/60, but soon rose, reaching 140 systolic, and then settled to remain about 110/64. On recovering from the anaesthetic he vomited, became restless, and pulled the transfusion needle from the vein. The remaining half-pint of blood was administered on return to the ward; 1/4 grain of morphine was given. Blood pressure was then 120/60 and the pulse 100. His general condition remained the same for the next twelve hours, with some nausea and vomiting, much pain, low fever, and sweating. Thereafter infection developed in the right stump; a secondary amputation was performed seven days later and he made a gradual recovery. He first passed urine twenty hours after admission, the volume of this sample being only 6 oz. For the first five days the output of urine was 25 oz. or under daily, the specific gravity being between 1030 and 1018; thereafter the output rose to between 70 and 90 oz. daily. The urine contained albumin, red cells, granular and cellular casts, and sugar for the first three days, and was alkaline in reaction for the first two days. Subsequently the urine remained clear, apart from occasional traces of albumin and sugar and excess of urobilin, for the next seventeen days before transfer.

Group IIIC (Low Blood Pressure, Rapid Pulse)

In contrast with Group IIIA and Group IIIB only 3 in this group of 27 are aged 50 and over; the age distribution corresponds with that of Group II. The injuries are classified as severe in 11 and as internal in 16; severe blood loss is thought to have occurred in 22. The majority were pale, but 3 are stated not to have been pale; about a half were sweating; nausea and vomiting are recorded in about a quarter. Apathy is mentioned in 2 only, 11 being described as mentally clear and 10 as variously confused, drowsy, delirious, or unconscious. Initial pulse rates varied from 100 to 200, being under 110 in 5, 120 in 2, 130 in 6, 140 in 2, while in 6 the rate was faster. In 4 the pulse was too feeble to be counted.

As in the other groups, all the cases were first treated with rest, warmth, and morphine, but all subsequently received transfusions. In 13 transfusion was preceded by a period of watching, during which time only one showed any material improvement. Five of them responded little or not at all to transfusion, and died without reaching operation. The other 8 patients all improved and were operated on: 2 died on the table and 4 required further transfusion. Transfusion was given earlier in 14 cases. Only one patient failed to improve, and soon died; 3 deteriorated again, and died without reaching operation. Ten reached operation, 7 of them requiring further transfusion during operation, 3 dying shortly. The following case is given as an example.

A smallish "tough" man aged 38 was admitted to hospital about three-quarters of an hour after injury by an exploding bomb. His right buttock and the back of his right thigh were deeply lacerated; the upper part of the thigh was greatly swollen by haemorrhage into the tissues. There was a compound comminuted fracture of the upper third of the femur and a comminuted fracture of the symphysis pubis. A wound in the right groin penetrated to the recto-vesical pouch, in which a bent half-crown was found at necropsy. The wounds were surgically untreatable, and bleeding continued while he lived. On admission his clothes were already soaked with blood. He was pale and pulseless, was sweating profusely, and was thirsty. His face and extremities were cold. He lay quietly on a stretcher on the bed, still dressed, mentally alert and complaining of pain in his leg. He had been given 1/3 grain of morphine before admission. The foot of the bed was raised and an electric cradle placed over him; his pulse became palpable, its rate being about 200 a minute; blood pressure measured 50/25 and his respirations were sighing. Transfusion was begun twenty-five minutes after admission, one pint of plasma being given in fifteen minutes; his haemoglobin was then 50%. The blood pressure had risen to 85/50 and the pulse rate was 104. Four pints of blood was given during the next four and three-quarter hours. Sweating ceased, and he gradually became warm. The blood pressure rose for a time to 90/45, but fell again, to remain about 80/45, the pulse rate mounting to about 140; respirations were regular at about 20 a minute. He vomited occasionally. Since he was uncomfortable his clothes were cut off, the stretcher was removed, and he was put in bed. He fell asleep, but wakened from time to time and smoked a cigarette. The wound was packed and a rubber bandage applied from knee to buttock. Haemorrhage was not controlled, and it became obvious that nothing could be done to save him. He was then given heroin, 1/8 grain intramuscularly, 1 pint of dextrose intravenously, and a fifth pint of blood over the next five hours. He gradually became worse and rather irrational, and sweating broke out again. His extremities became cold and his breathing stertorous. Blood pressure remained about 80/50 and the pulse about 140. Finally blood pressure fell steeply, the pulse became rapid and irregular, and he died ten and a half hours after admission. He passed no urine throughout, though he occasionally desired to do so; he drank 46 oz. of water. At necropsy, in addition to the injuries noted above, small haemorrhages were found in the sigmoid colon and caecum. The spleen was small, weighing 70 grammes. The bladder contained about 1 oz. of urine. The stomach was dilated. The organs generally were not pale.

[*To be concluded*]

The British Social Hygiene Council has issued a statistical summary of its educational work during the last decade. It is estimated that through direct education by means of courses, lectures, exhibitions, and other means, 163,000 young people (aged 14 to 25) and 363,000 adults in responsible groups have been reached, while nine million members of the general public have had some contact with this work on its more popular side. Experience has shown that teachers and health welfare workers who have attended a course of lectures impart their knowledge to the young people in their charge, and in this way it is estimated that indirectly over one million of them have been reached, as well as another very large body of adults. The numbers affected by these educational efforts represent something like 35% of the population at risk—that is to say, those exposed during the decade under review to the social dangers which the Council endeavours to control. This educational work has been done at an expenditure of about £166,500, of which £93,500 has been contributed by voluntary funds and £73,000 by local authorities' quota grants—a cost of about 6¾d. per person educated. The number of young people's courses is increasing: 646 courses, comprising nearly 2,000 lectures, were held during the period under review.

HERPES LABIALIS AFTER SULPHAPYRIDINE AND T.A.B. THERAPY

BY

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Although herpes labialis is clinically a harmless infection its causal agent has been the subject of much research. The condition is often seen in soldiers, and a Swiss regimental physician (Mayer, 1921) has described a spontaneous outbreak of 30 cases among 70 soldiers who slept in one barrack-room. Five of the 6 officers attached to the same unit were also involved. Last winter we observed 33 cases among hospital patients and investigated them from the laboratory point of view. Two classes of persons suffering from herpetic eruptions were studied—namely, normal healthy nursing orderlies, who developed it spontaneously, and a larger group comprising patients treated for gonorrhoea.

Before beginning our description of the clinical-pathological findings and animal inoculation results we should like to present a summary of modern conceptions regarding the aetiology and pathogenesis of herpes. The disease was first proved to be infective by Vidal (1873), and thereafter the classical researches of Levaditi, Doerr, and others showed that the causal agent was a filterable virus which was highly pathogenic to the rabbit, and which produced violent keratitis if implanted upon the scarified cornea of that animal, occasionally followed by meningitis and death. Individual strains of virus differed in their neurotropic affinities for the rabbit; consequently attention turned to herpes simplex virus as being a possible cause of encephalitis lethargica, and Levaditi and Harvier (1920) claimed to have isolated the virus from such cases. Unfortunately, independent confirmation of Levaditi's researches was lacking and the work fell into disfavour, but it may still prove that his investigations were made in advance of the times. The clinical nomenclature employed for the designation of the various manifestations of herpetic infection in man is unsatisfactory. Thus the usage of terms such as "herpes simplex," "febrilis," "labialis," "recurrent herpes," and "idiopathic and symptomatic herpes" indicates that the classification is inconsistent, and not based on anatomical, clinical, or aetiological grounds. For the convenience of readers over-seas the following account contains a summary of the facts respecting the clinical types of herpes and their aetiology. At the outset it should be understood that all forms of herpes affecting man, *other than herpes zoster*, are due to one and the same virus, which is pathogenic to the rabbit, whereas the virus of herpes zoster is a separate entity which is non-pathogenic to the rabbit and probably related to the virus of varicella. Both herpes and zoster viruses are particulate and visible organisms which occur in the form of minute virus elementary bodies, and Elford *et al.* (1933) have succeeded in measuring herpes simplex virus, estimating it to be 100 to 150 mμ in diameter. Herpes virus also produces specific histological changes, and acidophilic intranuclear inclusion bodies have been described in human corneal epithelium (Fuchs, 1933) and in the large epithelial cells present in human vesicle fluid (Da Fano, 1923).

Clinical Varieties of Herpes

Herpetic infection may appear in a variety of forms, as follows:

Herpes febrilis is the term applied to herpes arising during the course of a pyrexial disease, such as pneumonia, malaria, influenza, and other febrile disorders. The usual situation is on the lip, the term "herpes labialis" then being popularly used; but when other areas of the face are involved it is called "herpes facialis." Aphthous stomatitis is another disease which has been proved to be due to the herpes virus (Dodd, Johnston, and Buddingh, 1938; see also Gottron, 1938; Burnet and Lush, 1939). Herpetic vesicles are seldom bigger than a large pin-head and develop on a reddened base, being usually filled with clear fluid, although suppuration may occur. The commonest site for vesicles is on the lips, inside and around the mouth, the cheeks, and the auricles.

Herpes simplex is the designation applied to herpetic eruptions, unassociated with pyrexia, which may arise spontaneously, or secondarily to a variety of causes, such as after the injection of vaccines, milk, and colloidal metals (see Fischer, 1927); or the ingestion of certain foodstuffs followed by gastric disorder.

Herpes Genitalis.—Herpetic eruptions are not uncommon on the genitals, being found on the glans or body of the penis, and, in the female, on the labia. It is frequently associated with syphilis (Cranston Low, 1939).

Herpes Cornealis.—Herpetic infection of the cornea may assume a variety of forms, of which the dendritic ulcer is the best known (see Duke-Elder, 1938). The inflammatory reaction may be severe and result in serious scarring of the cornea.

Recurrent Herpes.—Certain persons are very susceptible to herpes, and why this should be is not clear. It is possible that they carry the virus in their saliva or elsewhere in the body, and Burnet and Lush (1939) have suggested that in such instances the infection is contracted in infancy, as an aphthous stomatitis, and persists throughout life. Some particular recurring susceptibility of the tissues may allow the virus to exert its pathogenic action from time to time, and, for instance, recurring genital herpes is apt to occur in cases of irritation due to chronic gleet and prostatitis (Avit-Scott, 1931). In women recurrent herpes is often associated with the menstrual period (Blum, 1926). Apart from the question of variations in the host as the predisposing factor in recurrent herpes, it is possible that the strain of virus itself may possess unusual tenacity. Thus Nicolau and Banciu (1924) inoculated a number of persons with strains of virus from cases of recurrent infection and found that two of these persons themselves developed recurrent herpes.

Nervous Manifestations.—Although herpes is usually regarded as a mild local lesion, more serious manifestations may arise from time to time. For example, French authors (e.g., Levaditi, 1922, 1926) describe *herpès névralgique de Mauriac*, with symptoms of severe pains, crises of hyperaesthesia in the perineum, tenesmus, sphincter spasm, and sciatica, all preceding the appearance of the eruption. In less severe cases herpes may be accompanied by pruritus, backache, and neuralgia. Doubtless these are due to the fact that the virus involves the corresponding ganglia, producing an inflammatory reaction (see Howard, 1905).

Herpetic meningitis is a distinct clinical entity, with sudden onset, rapid course, favourable outlook, and a lymphocytosis in the cerebrospinal fluid (see Abiteboul, 1936).

The Common Aetiology of Herpetic Eruptions

To-day all herpetic eruptions (always excepting, of course, those of zoster) are regarded as due to one and the same virus, based on the following evidence:

Vesicle fluid from all varieties of herpetic eruption can be inoculated into the human skin, with consequent production of a typical crop of "simplex" vesicles (Vidal, 1873; Lipschütz, 1921b; Teissier *et al.*, 1922b; Frei, 1931; Zurukzoglu and Hruszek, 1933).

Vesicle fluid from herpes febrilis produces a severe keratitis when applied to the rabbit's eye (Löwenstein, 1919, 1920; Grüter, 1920). Herpes cornealis yields a virus with the same characteristic effect (Doerr, 1920; Doerr and Vöchting, 1920; Luger and Lauda, 1921).

Herpes labialis yields the same virus, and will produce typical herpes cornealis when suitably applied to the human cornea (Doerr, 1920; Doerr and Vöchting, 1920; Fuchs, 1921, and see Fuchs, 1933).

Vesicle fluid from herpes genitalis also produces keratitis in the rabbit, and man can be reinfected with material taken therefrom (Fontana, 1921; Blanc and Caminopetros, 1921).

Herpes occurring in such diseases as cerebrospinal meningitis, pneumonia, diphtheria, influenza, catarrhal jaundice, erythemata, and secondary syphilis yields a virus showing the same characteristics as does that obtained from cases of primary herpes (Teissier *et al.*, 1922a).

Similar intranuclear inclusion bodies have been reported in human herpes febrilis, cornealis, and genitalis, and in experimental lesions in animals (Lipschütz, 1921a, 1921b, 1921c; see Fuchs, 1933).

Distribution of Virus in Infected and Healthy Persons

Herpetic Vesicle.—The virus is abundantly present in the vesicular stage, but disappears after the crust forms (Teissier, Gastinel, and Reilly, 1926a).

Blood.—The agent may be found in the blood of persons suffering from herpetic eruptions, although this is rare (Löwenstein, 1919; Bastai and Busacca, 1924b; Teissier, Gastinel, and Reilly, 1926a, 1926b).

Cerebrospinal Fluid.—Flexner and Amoss (1925a) examined the cerebrospinal fluid of 100 persons, including some suffering from epidemic encephalitis, but in only one case were they able to isolate herpes virus, and this from a syphilitic patient with no herpetic eruption. This is an important observation, and indicates that the virus may, although rarely, be found in the cerebrospinal fluid of patients who at the moment do not suffer from herpes. Zurukzoglu (1937) has also isolated two strains of herpes virus from the cerebrospinal fluid of healthy persons. With regard to the cerebrospinal fluid of herpetic patients, the consensus of opinion is that the virus may be found on occasions (Ravaut and Rabeau, 1921; Bastai and Busacca, 1924a; Zurukzoglu, 1937), but a number of competent investigators have been unable to detect it (for example, Doerr and Zdansky, 1924; Levaditi, 1925; Teissier, Gastinel, and Reilly, 1926a, 1926b).

Saliva.—Herpes virus has been found in the healthy saliva by a number of workers (for example, Levaditi, Harvier, and Nicolau, 1921; Doerr and Schnabel, 1921; Teissier, Gastinel, and Reilly, 1926b). The virus is attached to the salivary epithelial cells and is probably associated with the buccal mucus, because suspensions of salivary gland tissue are avirulent (Levaditi, Harvier, and Nicolau, 1921). The presence of the virus has usually been detected by its ability to produce keratitis in rabbits. Levaditi and his collaborators have stated that 80% of normal specimens of saliva produce experimental keratitis, but only in 15% is keratitis severe enough to be followed by cerebral involvement (see below). These high figures have not, however, been generally accepted by other workers, who have failed to find any virus in normal saliva (for example, Flexner and Amoss, 1925b). Nevertheless there seems no doubt that the virus can on occasion be found in this site, as described below. Several workers have investigated the saliva of persons suffering from herpes and have, though rarely, been successful in demonstrating the presence of the virus (for example, Isaicu and Telia, 1922; Flexner and Amoss, 1925b; Nicolau and Poincloux, 1922, 1924). Thus it has been found in the saliva of patients suffering from labial and facial herpes and herpes of the finger. The saliva of persons predisposed to herpetic eruptions contains the virus more often than that of other persons, and it may be found in the intervals between attacks (Levaditi, 1926).

Conjunctival Sac.—The virus can apparently be carried in a latent form in the conjunctival sac, but if the cornea be injured it may produce keratitis (Grüter, 1924; Busacca, 1925). It may also cause severe unilateral conjunctivitis, developing without obvious reason (Granström, 1937).

Other Skin Lesions.—The agent of herpes has been recovered on rare occasions from zoster vesicles and sycosis pustules (Naegeli and Zurukzoglu, 1935).

Our present article deals with the condition of herpes labialis which developed in healthy (often perfectly fit) male adults or, as in the majority of our cases, in patients under treatment for gonorrhoea. Below we describe our own work, which is subdivided into clinical data, laboratory findings, and animal inoculation experiments (performed by Dr. Rhodes), followed by a discussion on the aetiology of the condition.

The Present Research: Clinical Data

Altogether 33 cases of herpes labialis were studied by us: 6 occurred spontaneously in healthy nursing orderlies and 27 in patients suffering from gonorrhoea who had received a full course of sulphapyridine and subsequently developed herpes labialis after a provocative dose of T.A.B. The dosage of sulphapyridine administered was that employed before the latest Army instructions, and consisted of 9 grammes on the first day, 6 on the second and third, and 4 on the fourth, the total quantity given being 25 grammes in four days. The clinical results of such therapy were excellent, and in the majority of instances the urethral discharge had abated by the fifth day, so that on the sixth day patients underwent a test of cure consisting of a 0.2 c.cm. dose of T.A.B. vaccine injected intravenously. It was following this provocative dose of T.A.B. that herpes frequently manifested itself. In the first batch of subjects 22 patients received 0.2 c.cm. of T.A.B. vaccine intravenously, and forty-eight hours later it was noticed that all the men developed herpes labialis. Sixteen showed only a slight eruption, which cleared up spontaneously without any treatment; but in the remaining 6 the lesions were severe, and a 50% absolute alcohol dressing was applied with good effects.

Following these results Captain J. A. Scott, R.A.M.C., decided to reduce the dose of vaccine, and the next batch of 6 cases received 0.1 c.cm. of T.A.B. intravenously. Once again herpes was observed, and 3 persons were affected. Subsequently one of us (A. C. E.) decided to dispense with intravenous T.A.B. as a provocative measure, and thereafter hypertonic saline solution (instilled and retained in the urethra for a short time) was substituted as an alternative, following which no further cases of herpes appeared. The obvious conclusion to be drawn from such results is that if herpes labialis is to be avoided, intravenous T.A.B. vaccine should not be given to persons immediately after they have received a course of sulphapyridine. This is particularly so during the winter months, when, as we shall mention later, the herpes carrier rate is relatively high.

To provide a reason for this curious phenomenon is not easy, and at first sight it seemed that the T.A.B. was the primary exciting cause, since it is an acknowledged fact that the parenteral injection of bacterial protein (such as T.A.B. and gonococcus and other vaccines) may cause slight herpes labialis in a small proportion of individuals. But we had reason to suspect that the predisposition to herpetic infection was greatly enhanced by the intake of sulphapyridine, because no fewer than 24 out of 25 patients who received 0.2 c.cm. of T.A.B. intravenously and 3 out of 6 receiving 0.1 c.cm. of T.A.B. after sulphapyridine developed herpes. Thus we have inferred that while a course of sulphapyridine does not provoke herpes itself, the drug increases the susceptibility to herpes if a subsequent and large enough dose of T.A.B. is given intravenously. We need hardly add that for obvious reasons one cannot answer the question how many patients would have developed herpes if they had received T.A.B. intravenously without sulphapyridine, but it is most unlikely that such a high proportion would have done so.

The possibility of the batch of T.A.B. vaccine used having become accidentally contaminated with herpes virus was explored, but animal inoculation and sterility tests proved that the product was faultless. Finally one of us (C. E. v. R.) received 1 c.cm. of this same vaccine subcutaneously without developing herpes.

Laboratory Investigations

Animal Experiments.—Herpes virus was recovered from 6 out of 7 cases examined by employing the following technique:

Vesicle fluid was collected in sterile capillary glass tubes; a drop of the fluid was placed on the corneal surface of an anaesthetized rabbit and the surface of the organ lightly scarified with a needle. After forty-eight hours acute kerato-conjunctivitis had developed. A proportion of our animals contracted meningitis and died, and the condition could be transmitted to healthy rabbits by inoculating them intracerebrally or corneally with infected brain or corneal tissue suspensions. We also demonstrated the presence of elementary bodies of herpes in films prepared from the conjunctival exudate and from corneal scrapings of infected rabbits. Likewise, dark-background microscopical examination showed numerous highly refractile particles not unlike elementary bodies; but, for reasons already discussed by van Rooyen and Rhodes (1940), not much reliance was placed on this method of examination.

Examination of T.A.B. Vaccine.—The phial of material used for provocative injection was carefully examined for possible evidence of contamination with herpes virus, but although rabbits were inoculated by various routes none could be recovered. Simultaneously, general tests for absence of bacterial growth were conducted, and 1-c.cm. amounts of bacillary emulsion were inoculated in suitable solid and fluid media and incubated aerobically, and anaerobically in a Mackintosh and Fildes jar, at 37° C. for fourteen days, but, as previously, results were negative throughout. No blame could therefore be attributed to the T.A.B. vaccine.

Leucocyte Counts.—These were done for two reasons: first, to keep check on the white cell level during sulphapyridine treatment, and, secondly, to ascertain whether herpes occurred more often in patients possessing a low polymorph count. Results showed that no correlation existed between the degree of leucopenia and the onset of herpes, for in some cases after sulphapyridine the white cells fell to 6,000 per c.mm., whereas in others it remained as high as 9,000; but, nevertheless, both categories developed herpes labialis after a provocative dose of T.A.B. Likewise, 12 additional patients with white cell counts intermediate to the above also came under review, but again herpes developed indiscriminately. Finally, no relation could be shown to exist between the state of the differential white cell picture and the predisposition to herpes.

Carriers of Herpes Virus

It is universally accepted that herpes virus may occur as a commensal in the saliva of a large proportion of normal healthy human beings. According to Andrewes and Carmichael (1930) specific virus-neutralizing serum antibodies were discovered in 75% of individuals at the time of their experiments. What percentage of normal persons carry herpes virus it is difficult to calculate, but it is certain that the figure would vary from time to time, and most probably would be highest among those living in camps and hospitals, especially during the winter months, under conditions favouring the spread of droplet infections. To obtain a rough estimate of the carrier rate in a single ward in a hospital during December, 1940, we collected early morning specimens of saliva from 10 cured patients awaiting discharge to duty and examined them for evidence of herpes virus. Nine of these specimens of saliva were negative, but from the tenth a typical strain of herpes was recovered and passaged serially through three rabbits. Owing to the high cost of animals a larger number of tests could not be performed. The presence of herpes virus in one of the ten persons examined illustrates how easily it can be demonstrated in the mouths of normal individuals, and therefore something like 10% of persons could be assumed to be carriers of virus at the place and time of our observations. It should be remembered that every carrier of the virus does not necessarily show herpetic lesions; but, on the other hand, the converse is true, for every patient who develops herpes is proof of the presence of the agent in that individual's saliva. Thus it is quite feasible for a high virus-carrier rate to exist among a community which may exhibit a relatively low case incidence of herpes labialis—unless methods of therapy which are known to exert a herpetogenic action are used. In support of this hypothesis we would point out that during the winter months we noticed 6 cases of herpes which occurred spontaneously among healthy nursing orderlies and others in a unit about 300 strong. But when patients were treated with sulphapyridine and 0.2 c.cm. of intravenous T.A.B. no fewer than 24 out of 25 developed it, thus proving the high carrier rate existent.

Observations Repeated Three Months Later

From December, 1940, to March, 1941, intra-urethral saline was substituted for T.A.B. vaccine as a provocative measure, and over a hundred cases of gonorrhoea were effectively treated with sulphapyridine without any sign of herpes. At the end of this interval 3 cases of chronic gonorrhoea which had responded unfavourably to sulphapyridine arrived for attention, and it was decided to try the effect of mild protein-shock therapy. Accordingly each patient received intravenously 0.2 c.cm. from a fresh phial of T.A.B., and five days later two of the men developed herpes labialis. These results are of particular significance, since they support the principal points we had established earlier—namely, that the 25 cases already observed were not due to a spontaneous outbreak—and although virus was still prevalent in the saliva of most patients the use of sulphapyridine alone did not provoke herpes, but no sooner was intravenous T.A.B. used than herpes reappeared.

Discussion

Clinically, herpes labialis is such a trivial affection that it seems scarcely to warrant much attention, but there is reason to suggest that the virus is responsible either in part or in whole for certain other pathological lesions in man (see Levaditi and Lépine, 1938), and we believe that continued study of herpes may yield valuable information.

Certain facts have long been recognized, such as that it is frequently present in human saliva and is apt to attack healthy persons without the slightest provocation. More often, however, it is customary to meet with it in those whose health is poor, who have suffered from an acute febrile illness such as influenza or pneumonia, or whose vitality has been temporarily lowered by treatment such as pyretotherapy or protein shock.

Warren *et al.* (1940) reported that symptomatic herpes developed in 190 (46%) of 411 persons treated with fever induced by radiothermy (30 metres), infra-red radiations with carbon filament lamps, and hot-water baths. The temperature employed was 39.5° to 41.5° C. for periods ranging from 1 to 47 hours. Several important points were established during the conduct of their researches; for instance, it was not possible to link the frequency of herpes with the height of pyrexia attained, the duration of its application, or the method employed for its generation. The only relation which could be adduced was the fact that the incidence of herpes seemed to be maximal during seasons of the year when nasopharyngeal infections were prevalent. Thus during the month of November 57 fever treatments were administered and 50% developed herpes, while in the summer month of June 32 patients received treatment and only 12% contracted herpes. Cases seemed to occur in series, and at times for intervals of ten to thirty days none appeared, but at others every patient who was treated within a period of a week or longer developed it.

Warren and his associates have not offered any explanation of the latter phenomenon, but it is likely that variation in the normal herpes carrier rate was the reason why cases were more numerous at certain times than at others. Under normal circumstances herpes labialis tends to be a self-limiting process which heals readily without complications; but the careful observations of Warren *et al.* have disclosed that this is not invariably so, since some of their patients revealed signs and symptoms of meningo-encephalitis, resembling a condition named herpetic fever, described by Plessing in 1929 (Warren *et al.*, 1940). In the present article we have adduced further evidence in support of two well-established facts concerning the pathogenesis of herpes: first, that it is frequently to be found in apparently normal human saliva; and, secondly, that following protein-shock therapy herpes labialis may develop. Two new points are also mentioned—namely, that large doses of sulphapyridine sufficient to cure gonorrhoea fail to abolish herpes virus in the saliva of carriers, and that, after a course of sulphapyridine, pyretotherapy or protein shock is more likely to provoke herpes labialis.

At this stage it may well be asked, Why should a course of sulphapyridine render an individual liable to an attack of herpes? Unfortunately we are unaware why this should be so. It is conceivable that the phenomenon may resemble an effect opposite to that of non-specific stimulation of antibody formation by the injection of certain chemical salts—e.g., beryllium chloride, manganous chloride, colloidal manganese, salvarsan (Browning and Mackie, 1937). According to Nicolau (1938) benzol, arsenic, arsenobenzol, iodine, mercury, alcohol, and cocaine also have a tendency to be herpetogenic, and consequently sulphapyridine is unique, since it does not cause herpes itself but enhances the herpetogenic effect of T.A.B. It might be that sulphapyridine depresses the natural antibody level of human blood to herpes virus (see Brain, 1937), so that, in a carrier, a subsequent mild protein shock precipitates an attack; but this fails to explain everything.

In conclusion, we feel that there is something to be learnt in connexion with our experiences, and the obvious lesson is that sulphapyridine ought not to be used for treating herpes labialis or any other disease caused by herpes virus. Unfortunately very little is known of the pathogenesis of herpes virus, and although certain workers have claimed that such diseases as encephalitis lethargica and dendritic ulcer of the cornea are manifestations of herpetic infection, the whole question of the pathogenicity of herpes virus needs reinvestigation in the light of modern knowledge of virus infections.

Conclusions

Twenty-seven patients developed herpes labialis after a course of sulphapyridine followed by an intravenous injection of 0.2 to 1 c.cm. of T.A.B. emulsion.

All these persons probably carried the herpes virus in their saliva.

Large doses of sulphapyridine (25 grammes in four days) do not destroy herpes virus in human saliva, neither do they cause herpes labialis in carriers.

Although sulphapyridine does not provoke herpes the drug appears greatly to enhance the herpetogenic effect of T.A.B. vaccine if administered intravenously.

The phenomenon we have described is not due to leucopenia.

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A CASE OF PUERPERAL TETANUS

BY

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Cases of tetanus occurring in the mother following childbirth have been recorded in many parts of the world, but after careful study of the literature at our disposal we are unable to find any reference to such in the British Isles. Obstetrical textbooks discuss the possibility of its arising from imperfectly sterilized catgut used in suturing lacerations, and of tetanus neonatorum from infection of the umbilical cord. Because of the above facts we consider the following case should be recorded.

References in the Literature

We find that post-partum tetanus has been described mainly in America, France, China, and Germany. Some interesting points might be cited from various articles.

Milnor (1928) states that tetanus is prevalent in the Hawaiian Islands, and, though difficult to assess, he estimates the mortality to be in the region of 92%. Most cases arise from puncture of the skin, and a few from operative abdominal wounds, but puerperal tetanus is uncommon. He records two cases affecting both mother and infant in which there were no recoveries. Mattson and Starkey (1931) state that tetanus following induced abortion is very rare in America. The mortality is high—91% according to statistics compiled by Schneider. They record the case of a white woman aged 33 who developed tetanus fourteen days after induced abortion and three days after having a splinter in her finger. They consider the abortion the likely aetiological factor, taking into account the shortness of the incubation period from the injury to the finger and the fact that the latter showed no inflammatory reaction. The woman recovered, following treatment with antitetanic serum, 272,000 units being used in ten days by all routes—intrathecally, intravenously, and intramuscularly.

Byrne (1928) describes a case of puerperal tetanus, and states that he could find no record of a similar one in the district of Loyuan, although he knows it to be common in other parts of China. Knight (1933), referring to the appalling hygienic conditions in India attendant on childbirth, remarks that tetanus is a notable complication; the former he attributes to religious custom and superstition, and he recommends the use of patience, tact, and kindness in circumventing the latter. He considers "that the marvel is not that so many die, but that so many live under this Spartan treatment! It is truly a case of survival of the fittest." Rossi (1936) states that tetanus neonatorum is a frequent complication in Dakar, but reports only two cases of tetanus in the mother. Houël, Lesini, and Morand (1928) describe two cases of post-partum tetanus, one having generalized spasms, the other localized spasms confined to the jaw and the cervical and dorsal spine muscles.

Case History

A woman aged 25 was admitted to the North Staffordshire Royal Infirmary on October 16, 1940, complaining of spasms of the masticatory muscles and aching of the neck and back muscles. Fifteen days previously she had been delivered of a normal baby by forceps, and the perineum had been repaired with fine silkworm-gut sutures. Five days before admission she noticed stiffness of her jaw muscles, with the onset later of definite spasms which gradually increased in severity. On October 15 aching of her neck and back muscles began. The patient could not recall any recent trauma, and she was obviously a woman who took good care of her person.

The patient was well nourished and of healthy appearance, and she was obviously in pain. It was impossible for her to open her mouth more than a quarter to half an inch; her tongue was swollen and discoloured, and her speech slurred. The masseters were in tonic contraction, entering at intervals into severe spasm of variable duration. She was found to have cervical rigidity.

Central Nervous System.—Cranial nerves: Nothing abnormal discovered. Limbs: Motor and sensory responses normal, but all reflexes exaggerated; muscle tone not abnormal, plantar responses flexor. Abdominal reflexes were not elicited.

Cardiovascular System.—Pulse: Good volume and tension, regular; rate 90, rising to 130 during the paroxysmal spasms. Heart: Normal position and sounds.

Respiratory System.—Lungs: No impairment of percussion note; broncho-vesicular breath sounds; no adventitious sounds.

Alimentary System.—Abdomen: Lineae atrophicae; fundus of uterus 2 inches above symphysis pubis; liver and spleen both palpated 2 inches below costal margin.

Genito-urinary System.—No discharge per vaginam.

Special Examinations.—Vaginal swab: Direct smear and culture—no tetanus bacilli. Stool: Direct smear and culture—no tetanus bacilli. Urine: Trace of albumin; 1.7% sugar (lactose). Cerebrospinal fluid: Fluid clear, under pressure of 225 mm. of H_2O, rising during spasms; a few lymphocytes and red blood corpuscles; sugar 166, chlorides 693, proteins 30 mg. per 100 c.cm.; no increase in globulin content. Serum calcium: 9 mg. per 100 c.cm. Blood count: R.B.C., 4,500,000; Hb 75%; slight anisocytosis; W.B.C. 15,000—polymorphs 79%, lymphocytes 18%, eosinophils 1%, basophils 2%.

Progress of Case

Admitted one evening, the next day is taken as the first in this description.

1st Day.—Severe and frequent spasms of masseters, on an average at quarter-hour intervals; cervical rigidity, complaining of backache.

2nd Day.—Marked cervical rigidity, occasional spasm of back, patient developing opisthotonos position; facial expression typical risus sardonicus. Onset of foul-smelling sanguineous discharge from vagina.

3rd Day.—Marked cyanosis. Severe and frequent spasms of the back muscles; also of the jaws, causing the tongue to become extremely swollen and discoloured.

4th Day.—No change.

5th Day.—Spasms more severe than they had ever been before. Complaining of right-sided earache. Auriscopic examination—nothing abnormal.

6th Day.—Spasms less severe than yesterday, but frequent.

7th Day.—No change.

8th Day.—Spasms still severe. Vaginal discharge much less.

9th Day.—No change.

10th Day.—Urticarial serum rash developed; itching intense, aggravating the spasms. Discharge from vagina had almost ceased.

11th Day.—Rash still present, itching less intense following treatment with lotion. Spasms less severe and frequent—on an average at half-hourly intervals.

12th Day.—Rash disappeared. Spasms only of jaw muscles; aching of neck and back muscles. Taking semisolid diet.

13th Day.—Slight and infrequent jaw spasms.

14th Day.—Occasional jaw spasms. Tenderness of neck and back muscles on palpation.

15th Day.—No spasms. Tongue swollen and discoloured.

18th Day.—Patient put into general ward. Sitting up in bed: taking almost full diet; tongue almost normal.

19th Day.—Massage instituted.

21st Day.—Allowed up a little.

24th Day.—Discharged from hospital.

Special Points

Pulse: Volume and tension never gave cause for worry; the rhythm was constantly regular, the rate 90, rising to 130 during the spasms. Blood pressure 130/75, rising during spasms.

Temperature rose to 99° F. on the third day, remaining for four days at that level, and then dropping to normal. The woman was an ideal patient; her morale was at all times high, and her

mind was lucid throughout the illness. She could always put the spatula in her mouth during the spasms to prevent damage to her tongue.

Treatment

General.—Special points to be emphasized: separate and darkened room; quiet enforced; special day and night nurses.

Specific.—Serum: 200,000 units concentrated A.T.S. intravenously the first day; 40,000 units intramuscularly the second, repeated on the third and fourth days.

Sulphonamide Chemotherapy.—Soluseptasine 10 c.cm. 5% solution four-hourly from admission for twenty-four hours, then 1 gramme sulphapyridine by mouth with an occasional injection of the former if the tablets could not be taken. Sulphonamide therapy stopped on the third day owing to the patient being markedly cyanosed.

Sedatives.—(1) Evipan sodium 0.5 to 0.75 gramme; intravenous and intramuscular injections enabled the patient to obtain four to five hours' repose. (2) Avertin, given in a dosage of 0.1 gramme per kg. body weight, provided lengthy and adequate rest. (3) Paraldehyde, 5 to 6 drachms rectally, was of little value. (4) Nembutal, 4½ grains by oral and rectal routes, gave very short periods of rest. (5) Chloral hydrate, 60 grains orally, gave much comfort during the day, two doses usually being sufficient. (6) Hypodermic injection of morphine 1/3 grain appeared a beneficial substitute for the chloral hydrate.

Diet.—We were always able to feed the patient by mouth with fluids, small and frequent quantities being taken through a straw. Fluids given: Horlick's, ovaltine, glucose fruit drinks, meat broths, bovril; egg, milk, and brandy beaten up together; also cream brought in by the patient's relatives. From the eleventh day she was able to take soft solids such as fish and vegetable purées, jellies, etc.

Oral hygiene: Mouth cleansed with glycothymolin swabs.

Back: This was treated daily.

Bowels kept open by gentle enemata.

Rash: Calamine and carbolic lotion employed for this.

Vaginal discharge: Gentle hydrogen peroxide douches daily.

Differential Diagnosis

The conditions to be excluded in the diagnosis were tetany, strychnine poisoning, and local oral disease. Tetany is distinguished by the presence of hyperexcitability of the motor nerves and typical spasms of the limbs, all of which were absent in our patient. It is interesting to record the case of a woman, admitted two days after the one under discussion, who twenty-four hours after childbirth developed trismus and risus sardonicus, associated, however, with carpopedal spasm, and who responded satisfactorily to calcium therapy.

Strychnine poisoning was excluded by the fact that the woman's muscles did not relax between the paroxysmal spasms, and local trismus by the absence of oral sepsis, etc

Despite our inability to isolate the tetanus bacillus, confirmatory evidence of the diagnosis is implicit in the successful issue of the case following antitoxin therapy.

Discussion

It has been assumed in this case that infection with the *B. tetani* entered via the lacerated vaginal tissues. No positive evidence, however, can be offered to substantiate this assumption, smears and cultures being negative. We believe that we are justified in accepting the patient's statement concerning the absence of any other traumatic lesion that might have given rise to her condition. The presence of a foul sanguineous discharge per vaginam two days after admission is in our opinion strong evidence supporting our theory regarding the site of infection. Should the above conclusion be correct, whence did the offending tetanus bacillus originate? Here again we are faced with the lack of certain evidence.

We have no knowledge as to the asepsis of the obstetrical procedures, and were unable to obtain any of the material used in suturing the perineal lacerations. What importance can be attached to the fact that the baby did not develop tetanus? It is probable that the mother inoculated herself from the rectum, remembering that the bacterial flora of the human body can include the tetanus bacillus (Gardner, 1938; Mackie and McCartney, 1938). It is strange, therefore, that infection does not occur with greater frequency.

The long incubation period, slow development of symptoms, absence of marked pyrexia, and survival of the patient after ten days from the onset were all favourable points in assessing the prognosis.

Treatment consisted in providing adequate nourishment, assuring sufficient rest with a variety of sedatives, and the institution of tetanus antitoxin therapy, as recommended by Paterson of Australia (Price, 1937), an initial massive dose of 200,000 units being employed intravenously. It is probable that the intramuscular doses were unnecessary. No antitoxin was given intrathecally, one of us (B. M.) having seen cases of aseptic meningitis following the introduction of serum by this route.

Summary

A case of tetanus following childbirth is described, and the possibility of infection via a lacerated vagina or perineum discussed.

The merits of various sedatives employed are noted.

The success of antitoxin therapy along the lines suggested by Paterson of Australia is emphasized.

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SAND-FLY FEVER AND BENIGN LYMPHOCYTIC MENINGITIS

BY

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During my period of service from May, 1940, to February, 1941, as acting medical specialist to the Naval patients at a general military hospital a number of cases of benign lymphocytic meningitis were admitted. It was observed that the symptomatology of this disease closely simulated that of sand-fly fever, and in a certain number of cases the diagnosis was established only after lumbar puncture.

The Army medical specialist—Major E. H. Evans—and I decided to investigate this similarity further. It was considered unreasonable and inadvisable to submit all cases of sand-fly fever to lumbar puncture. This form of investigation and treatment was therefore reserved for (1) cases sent in as meningitis; (2) cases sent in as sand-fly fever or pharyngitis, with a complaint of occipital headache or pain in the neck; (3) cases sent in as sand-fly fever, pharyngitis, or with any other diagnosis in which there was neck rigidity, head retraction, Kernig's sign, or other indication of a possible meningitis. Unfortunately before our investigations were completed I received a fresh appointment. It was therefore decided that I should publish my findings on the cases under my care, and that Major Evans should report his further investigations at a later date.

From August 7 to December 12, 1940, 15 patients were admitted who gave the necessary indications for lumbar

puncture: 8 proved to have benign lymphocytic meningitis and 7 had sand-fly fever. The season for sand-fly fever officially ends on November 18, so that the case admitted on December 12, which proved to be one of benign lymphocytic meningitis, would appear to disprove the association of the sand-fly with this form of meningitis. However, a sand-fly was killed in the medical mess a few days after this case was admitted. The patients were, of course, all men; 14 were 31 years of age or under, the other was 44. Major Evans demonstrated to me that the incidence curve of the cases of benign lymphocytic meningitis followed almost precisely the incidence curve of cases of sand-fly fever admitted during 1940.

With the exception of 2 cases the duration of the disease on admission was forty-eight hours or less. One of these exceptions was a case of sand-fly fever and the other of benign lymphocytic meningitis, and the duration was four and five days respectively. Progress in the two conditions was equally satisfactory and recovery was rapid. The treatment consisted of lumbar puncture and the four-hourly administration of a mixture of aspirin, phenacetin, and caffeine citrate. Sulphapyridine was not used.

Symptoms and Physical Signs

The following is an analysis of the symptoms and physical signs of the 15 cases:

	Benign Lymphocytic Meningitis (8 Cases)		Sand-fly Fever (7 Cases)	
	No. of Cases	%	No. of Cases	%
Symptoms				
Orbital pain	8	100	5	71·4
Photophobia	4	50	2	28·6
Frontal headache	8	100	7	100
Occipital „	5	62·5	2	28·6
Vomiting	6	5	1	14·3
Pain in neck	7	87·5	5	71·4
Spontaneous	3	37·5	4	57·1
On flexion	7	87·5	4	57·1
Pain in joints	1	12·5	2	28·6
„ „ muscles	1	12·5	4	57·1
„ „ back	4	50	2	28·6
Slight sore throat	1	12·5	—	—
Mild rigor	1	12·5	2	28·6
Diarrhoea	—	—	3*	42·8
Temperature on admission	98·8°–101·8°		100·2°–103·2°	
Pulse	50–90 (Av. 75)		80–104 (Av. 93)	
Physical Signs				
Conjunctival congestion	2	25·	3	42·8
Congested fauces	1	12·5	3	42·8
Bronchitis (slight)	1	12·5	1	14·3
Tenderness in right hypochondrium (slight)	1	12·5	—	—
Neck rigidity	7(3slight)	87·5	2(1slight)	28·6
Retraction of head (slight)	1	12·5	—	—
Reflexes:				
Sluggish pupillary light reaction	1	12·5	1	14·3
Biceps absent	5	62·5	6	85·7
Triceps absent	2	25	4	57·1
Supinator absent	4	50	6	85·7
Knee-jerk absent both sides	1	12·5	2	28·6
„ „ „ right side	1	12·5	—	—
„ „ „ left side	—	—	1	14·3
„ „ sluggish both sides	—	—	2	28·6
„ „ „ right side	—	—	1	14·3
„ „ „ left side	1	12·5	—	—
Ankle-jerk absent both sides	2	25	3	42·8
„ „ „ left side	—	—	1	14·3
„ „ „ right side	—	—	1	14·3
Plantar reflexes	Normal			
Extensor right side	—	—	1	14·3
Not elicited left side	—	—	1	14·3
Abdominal reflexes:				
Absent both sides	—	—	2	28·6
„ left side	1	12·5	—	—
Sluggish both sides	—	—	1	14·3
Positive Kernig	4(2slight)	50	1 (left side)	14·3
Brudzinski	Normal		Normal	
Lumbar puncture:				
Normal pressure	4	50	6	85·7
Slightly increased pressure	2	25	1†	14·3
Moderately „ „	2	25		
Cells: Lymphocytes	74–332 per c.mm. (Av. 183)		1–5 per c.mm.	

The cerebrospinal fluid was clear in all cases and reactions normal except for slightly increased protein content in the benign lymphocytic meningitis cases. This increase was in proportion to the number of cells present.

* One case two days before onset of sand-fly fever.

† Paitent had right extensor plantar, which became normal after lumbar puncture.

Commentary

Analysis reveals that the cardinal symptoms and signs of sand-fly fever—namely, frontal headache, orbital pain, photophobia, pains in the back, fever, and conjunctival congestion—are duplicated in benign lymphocytic meningitis. Symptoms that may occur in both conditions but are more commonly present in sand-fly fever are diarrhoea, muscular pains, and to a lesser extent pains in the joints. Symptoms which may occur in both conditions but which are more commonly present in benign lymphocytic meningitis are occipital headache and vomiting. Pain in the neck, especially on flexion, was more frequently met with in benign lymphocytic meningitis, but was surprisingly common in sand-fly fever.

It will be observed that the temperature and pulse rate are higher in sand-fly fever and that congestion of the fauces is more common. Head retraction was not seen in any case of sand-fly fever and was most uncommon in the type of meningitis under discussion. Neck rigidity, however, was a fairly constant sign in benign lymphocytic meningitis, but was present also in 28% of the sand-fly fever cases. (It will be remembered that only cases which presented possible meningeal symptoms or physical signs are dealt with here.)

Abnormal ocular reflexes were equally rare in the two conditions. As regards peripheral nerve reflexes, it will be observed that without exception they were absent slightly more often in sand-fly fever than in benign lymphocytic meningitis. The only case showing a definitely abnormal plantar reflex proved to be a case of sand-fly fever. That patient also had cerebrospinal fluid under slightly increased pressure, and his plantar response returned to normal on the day after lumbar puncture. Kernig's sign was positive in only 50% of the cases of meningitis, and occurred in one case of sand-fly fever.

As a result of these experiences it was customary to suspect the case to be one of benign lymphocytic meningitis if the patient complained of occipital headache, pain in the neck, or vomiting. Moderate fever, comparatively slow pulse rate, neck rigidity, retraction of head, and any abnormal reflexes were also suggestive of this condition. Head retraction alone excluded sand-fly fever; and vomiting, slow pulse rate, moderate pyrexia, neck rigidity, and a positive Kernig were strong presumptive evidence of benign lymphocytic meningitis.

It is nevertheless true that several cases thought to be benign lymphocytic meningitis proved to be sand-fly fever, and vice versa, the examination of the cerebrospinal fluid producing an unexpected report. It would therefore appear that benign lymphocytic meningitis is made up of a group of diseases, and that the virus of sand-fly fever is capable of producing the condition.

The annual report for 1939 of the Director-General of Public Health, New South Wales, deals with a population of more than 2,700,000. The low death rate of 9.75 per 1,000 was nevertheless 5% above the average for the preceding five years; the birth rate was 17.46. The report states that the incidence of typhoid fever was the lowest yet recorded. Diphtheria shows some increase on the previous year, despite a widespread scheme of immunization, in which the State Government co-operates with local authorities. Satisfactory progress is recorded in the field of maternal and infant welfare. A consultant service is provided for the poorer patients; a mobile blood transfusion unit is also available. Every maternal death is reviewed by a medical committee. At the pre-natal clinics attendances increased by 40% over the figure for the previous year. This compares most favourably with the increase of 2% recorded in the preceding report.

PERSISTENT LACTATION

WITH A NOTE ON CHIARI AND FROMMEL'S DISEASE

BY

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The purpose of this brief communication is to draw attention to a case in which lactation had been established for the extraordinarily long period of fifteen years. Little is known of the pathology of this condition. The literature on the subject is mostly related to the association of persistent lactation with utero-ovarian atrophy. From this aspect the condition has been studied by Chiari, Braun, and Spaeth (1852-5), Frommel (1882), and more recently by Sharp (1935).

Between 1848 and 1855 Chiari, Braun, and Spaeth contributed a series of gynaecological articles from the Vienna clinics; in these Chiari discussed at some length the association of genital atrophy with prolonged lactation, and it appears that Simpson (1872) and Schroder were familiar with the syndrome. Chiari discusses two cases of puerperal utero-ovarian atrophy accompanied by persistent lactation. Frommel investigated a series of 3,000 labours and puerperia, and arrived at the conclusion that the incidence of uterine atrophy was not more than 1%. In his series the ages of the patients exhibiting the syndrome varied between 19 and 40 years, the average age being 29.6 years. Frommel believed the condition to be most common in women who had had numerous pregnancies, but it may arise after first babies.

The association of persistent lactation with utero-ovarian atrophy is known to some writers as Frommel's disease, but it would appear to be more correct to call it Chiari and Frommel's disease in view of the early writings of the elder Chiari.

Clinical observations indicate that persistent lactation and utero-ovarian atrophy coexist as described by Chiari, Frommel, and others; in some cases lactation may persist for longer periods than usual without evidence of genital atrophy, whereas in others genital atrophy may take place in the absence of prolonged lactation. Frommel records the case of a young woman who after her first pregnancy failed to lactate, but whose genital organs showed marked atrophy.

In Chiari and Frommel's disease atrophy of the uterus is always present, but the degree of atrophy varies from case to case. In some cases the uterus is very small and thin, the length of the cavity in one of the recorded cases being reduced to no more than 4.5 cm. The atrophic process also attacks the cervix, this organ having the appearance characteristic of senile women. In the majority of women suffering from this condition the ovaries are small and atrophic. Of Frommel's 28 cases only 3 had ovaries of normal size.

Menstruation does not always appear after weaning in cases in which this disease develops. It would seem that the development of amenorrhoea depends upon the degree of atrophy which has been attained.

The essential features of Chiari and Frommel's disease are therefore two in number—namely, utero-ovarian atrophy of variable degree, and persistent lactation which also varies in degree as demonstrated by Frommel's case; some women may have amenorrhoea as an additional feature.

Record of a Case of Persistent Lactation

The patient was a married woman 35 years of age. She had one child, aged nearly 16 years. Hospital advice was sought regarding the discharge of blood-stained milk from the left nipple which had been noticed at intervals during the previous three months. Further inquiry elicited the information that she had lactated continuously since she had weaned her baby—namely, for a period of fifteen years.

Examination revealed mammary glands which were rather voluminous, and it was found that milk could be expressed from each of them with the greatest ease. A few red blood cells were present in the milk first obtained from the left breast. Nothing abnormal could be palpated in the substance of the breast. At the time it was thought that the presence of blood might be due to a duct papilloma or possibly to the rupture of small varicose veins within the breast.

Pelvic examination showed that the uterus was rather smaller than one would expect, firm in consistence, and normal in position. The menstrual losses lasted about four days and occurred at intervals of about a month. The menstrual periods had reappeared about six months after the birth of the baby, and had been constant since that time. Other than the features already mentioned, no evidence of disease of the pituitary gland was discovered.

It was apparent that the patient believed it to be perfectly natural for a woman who had borne a child to lactate for the remainder of her reproductive life, and she did not deny that it was her custom to stimulate the production of milk by expressing it manually every day.

Commentary

This case is of interest in so far as it is one of those rare examples in which lactation persists for many years—in this instance for fifteen years after weaning the baby. It is hardly to be regarded as a case of Chiari and Frommel's disease, as the degree of utero-ovarian atrophy is of a minor nature—certainly not so profound as to cause any menstrual changes. Nevertheless other writers have pointed out that the degree of atrophy varies from case to case, and it is possible that this patient is an example of the mildest variety of genital atrophy associated with prolonged lactation.

It is of especial interest to note that daily manipulation of the breasts had been practised by the patient, and it is possible that this may have been just as influential in prolonging lactation as it is in the case of certain well-known domestic quadrupeds.

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Medical Memoranda

The Blood Supply of Human Heart Valves

Accurate knowledge of normal structure is important in clinical medicine, as anatomical characteristics often throw light on or suggest explanations for some of the mechanical components concerning the localization of disease processes within the body or a tissue. The structure of normal human heart valves, for example, must be properly understood before the histological basis of the pathogenesis of valvulitis can be appreciated.

In view of the importance of such knowledge it is unfortunate that three recent textbooks (Baitsell, 1940; Grant, 1940; Maximow and Bloom, 1939) depict normal human atrioventricular valves as containing a richly anastomosing network of blood vessels extending from their bases to the free margin. All quote the authority of Bayne-Jones (1917), and all reproduce the drawing made for him by Max Brödel. It is a semi-diagrammatic figure based on the injection of several specimens and purporting to give a "composite picture of the typical vascular anatomy of a completely injected human mitral or tricuspid valve." The reason for the production of such a composite figure is in itself puzzling, as Bayne-Jones laid no claim to have succeeded in making a complete injection in any valve or cusp.

WORK OF GROSS

The question of the presence or absence of blood vessels in normal human heart valves was for long of a controversial nature, but the final report by Gross (1937), in which he summarizes in admirable fashion the various difficulties that have hindered the true solution of the problem, leaves no doubt as to the non-vascular nature of these structures. Gross's final contribution is of particular significance in view of the fact that he and his collaborators had previously adduced evidence which favoured the belief that blood vessels may exist in a small percentage of normal human heart valves (Gross, 1921; Kugel and Gross, 1926; Ritter, Gross, and Kugel, 1928). Re-examination of their material and of many hundreds of additional specimens, however, led them to express doubt as to the normality of any human heart valve possessing blood vessels (Gross and Friedberg, 1936; Gross and Kugel, 1931). Dow and Harper (1932) reached a similar conclusion.

The presence of blood vessels in heart valves the site of an inflammatory process is undoubted, and it had been shown that they ramify for the most part in the subendothelial zone of the affected cusps. The most probable explanation for their presence is that they have been formed in response to toxic or bacterial injury of the cellular elements of the cusp. The exact nature of the injury is not completely understood, but the work of Gross (1937) clearly indicates that rheumatic fever which had completely regressed clinically is responsible for their formation in many instances. He states: "The supposedly normal vascularized series owes the presence of blood vessels in the valves to a previous mild and in most instances completely healed rheumatic process." Harper (1940) described the reaction of valvular tissue and its relation to the formation of new blood vessels in a case of early rheumatic valvulitis.

DISCUSSION

In the subendothelial zone of normal human valves there are several cell types, many of which under normal circumstances are probably non-motile elements playing an important part in the general metabolism of the cusp. In valvulitis they are activated and produce other cell types. This reaction is primarily one of local defence, but it is also evident that it is secondarily associated with the establishment of new blood vessels within the cusps (Harper, 1940). In the light of these observations it is clear that primary embolism cannot be considered a factor in the genesis of endocarditis in man.

With reference to work on experimental endocarditis it must be emphasized that the significance of the presence or absence of blood vessels in the normal cusps of the animals used has not been sufficiently appreciated. Blood vessels occur normally in the heart valves of certain species—for example, cat, dog, sheep, goat, pig, ox, and horse. These cannot be regarded as analogous to those sometimes occurring in man, which, as explained above, are of inflammatory origin. Rabbit heart valves conform to the human type (Harper, 1938).

These observations have obviously a direct and important bearing on the interpretation of experimental results, and indicate also the care that must be exercised in the comparison of results of experiments on different mammalia. Thus it is essential that statements on details of normal structure should be accurate not only from the purely histological point of view but also from their bearing on the interpretation of disease processes.

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Reviews

MODERN SCIENCE AND THE LEGACY OF ANCIENT LEARNING

A Short History of Science to the Nineteenth Century. By Charles Singer. (Pp. 400. 8s. 6d. net.) Oxford: The Clarendon Press. 1941.

To inquire why men thought what they did when they did is always an engaging enterprise, and this is the keynote of Dr. Charles Singer's *Short History of Natural Science.* Well known as a most learned authority on the subject, he has in this book so presented the facts as to fascinate anyone interested in the history of ideas. The final exposition of an individual discovery is very different from a description of the steps by which it was reached, but by taking a more extended view of the sequence of ideas, Dr. Singer labels each epoch with its leading motive in a manner which is helpful and impressive.

Thus we start with the emergence of mental coherence in the Greek world when philosophy became based on natural science to the neglect of ethics; then Plato and Aristotle sought to adjust their rival claims, with a preference for ethics, while repudiating the popular religion of the day. This he calls the Great Adventure. Next Alexandrian thought developed separate departments for science, ethics, and religion, and ended with definite scientific deterioration. Intellectual nerve was failing. Under the Roman Empire, the prevalent schools of thought were largely indifferent to science, which deteriorated still further. Scientific inspiration waned to nothing. The vision of the Stoics "was very different from that given by the spacious claim of modern science. . . . It was an iron, nerveless, tyrannical universe . . . in which the Roman thinker must have felt himself fettered, imprisoned, crushed. He had abandoned the faith of his fathers and . . . found himself embracing a machine. . . . It was reaction against this pessimism which led to the great spiritual changes in the midst of which antiquity went up in smoke." And so followed the Dark Age characterized by the Failure of Knowledge just because to the mediaeval mind the world seemed completely knowable in both space and time—and thus not worth knowing. Without curiosity there can be no science, and if the whole scheme of things is regarded as having been revealed once for all, what basis for curiosity remains? Then came the Revival of Learning; seeking to penetrate the dark shadows the humanist tried to discern the antiquity that was beyond. And as he strained his eyes, another vision, a reflection perhaps of himself, came sometimes to him. Then "the vision would be clouded over by that terrible erudition which in the absence of general ideas has been and is one of the enemies of science." Leonardo, Vesalius, and Galileo were more truly the heirs of Plato and Aristotle than were the editors of their texts. For it is living literature, art, and science and not classical scholarship that inherited the legacy of ancient wisdom. That was where the revival of learning failed until the Insurgent Century (that is, the seventeenth) made new attempts at a synthesis aided by the weapon of the experimental method.

The eighteenth century, using the Newtonian key to the mathematics of the heavens, enthroned determinism. And so we are led on to the development of modern science, and the change of thought produced by the doctrine of evolution, in itself a return to the Greek idea that everything is in a state of "becoming." In conclusion Dr. Singer sees the dawn of a stage in which an adequate scientific equipment will involve some regard to the world

as an interconnected whole, in which science and philosophy will dwell less apart, though science must of necessity restrict itself to phenomena. But for science merely to quote authority is useless. The demand for evidence, for tangible data, for experience that can be repeated at will, has created science as we know it.

"Everyone is by nature a disciple either of Plato or of Aristotle," and one might add as a corollary, is either an introvert or an extrovert. Yet surely no one is entirely one or the other, for "our minds, as much the product of evolution as our bodies, have in the ages developed as mirrors of the world in which we dwell; they are attuned to Nature. The mathematical thought of ages on the nature of certain curves elaborated a knowledge which Kepler and Newton fitted into the phenomena of planetary movements. The minds of the pre-Keplerian mathematicians . . . were working on Nature's lines, though they knew it not." With which pregnant saying we must leave this book, which it has been an intellectual pleasure and stimulus to read.

BACILLARY AND RICKETTSIAL INFECTION

Bacillary and Rickettsial Infections: Acute and Chronic. A Textbook. By William H. Holmes, Professor of Medicine, Northwestern University Medical School. (Pp. 676. 25s. net.) New York and London: The Macmillan Company. 1940.

To the series entitled "Orientations in Medicine" Dr. William H. Holmes of Chicago has contributed a volume on *Bacillary and Rickettsial Infections: Acute and Chronic*. Actuated, as many of his predecessors have been, by the belief that the present can be perfectly comprehended only by a knowledge of the past, the author endeavours to trace the history of each disease so far as it is known from the earliest times to the present day. Symptomatology, epidemiology, and bacteriology are closely intermingled. Pages are spent on quotations from ancient writers. History is enriched by anecdote, and references to the Bible are numerous. Our modern knowledge is sometimes given very fully, sometimes but briefly. Long chapters are spent on typhus, typhoid, and tuberculosis; anthrax is dismissed in a few pages. The result is, as the author admits, unconventional. The volume cannot be regarded as a systematic treatise of either the history of medicine, clinical medicine, bacteriology, or epidemiology, but it comprises a mixture of these, along with some immunology and treatment, which are likely to afford more pleasure to the casual reader than to the earnest seeker after knowledge. The book is supposed to be for students, but rightly or wrongly we doubt whether students in this country would welcome a mode of presentation in which so much stress is laid on the historical method of approach, especially when the history is apt to be incomplete and to be neglectful of the German literature. To write so fully on typhus fever and its diagnosis without describing the original observations of Weil and Felix, or on tuberculosis without mentioning the work of the Royal Commission, leads inevitably to the feeling that the author's own knowledge is imperfect or his judgment of doubtful validity.

For the qualified man and for the interested lay reader the book presents much that is attractive, and it is likely to command a wide circle of readers. Its subject-matter is confined strictly to diseases caused by bacilli and rickettsiae. Other bacterial diseases, such as those due to coccal, spirochaetal, or protozoal organisms, are reserved for another volume. There is a good deal of carelessness over the spelling of authors' names, especially in the text, which is frequently at variance with the bibliography. Greater attention might be paid to this defect in a subsequent edition.

HAEMORRHOIDS

Haemorrhoids and their Treatment: The Varicose Syndrome of the Rectum. By Kasper Blond, M.D.Vienna. Translated by E. Stanley Lee, M.S., F.R.C.S. (Pp. 140. 15s. net.) Bristol: John Wright and Sons, Ltd.; London: Simpkin Marshall, Ltd 1940.

A specialist's general outlook is bound to be influenced more or less by the nature of his specialty. The author of *Haemorrhoids and their Treatment* sees much disease from a proctological point of view; thus many cases of so-called prostatic hypertrophy, he tells us, are really cases of acute congestion or oedema of the prostate brought about by impairment of its venous return, and many prostatectomies could be avoided if a proper examination were made with a proctoscope. At the same time, and to do him justice, he does bring a general view to bear upon his own specialty, and asserts that the rectal varicose syndrome is not a localized disease of one organ but rather an indication of the dysfunction of the whole alimentary tract. This is essentially sound, and he will no doubt find many to agree with him that in the apparently healthy person haemorrhoids are usually due to overeating. If this contention is correct in these days of rationing, fewer should be troubled with so-called attacks of piles and their complications.

Dr. Blond's thoughtful book is refreshing from the fact that it does not closely follow the beaten track of current opinion. But such a departure from custom as to call anal fissures "thrombophlebitis marginalis recta chronica" may savour of a striving after effect, which is really quite needless since there is so much in the book that is good. A novel view put forward is that pruritus is a toxic manifestation of portal blood in the peripheral systemic venous circulation caused by a backflow where the two venous systems anastomose—between the superior and inferior haemorrhoidal plexuses. The author suggests that scrotal, vulval, and even anal eczema are all due to a retrograde flow of portal blood into the pelvic veins, and, in the case of the crural lesion, downwards into the incompetent saphenous system also. This explanation is ingenious, to say the least of it, and there is much in the monograph that is well worthy of study by general surgeons, proctologists, and practitioners. Mr. Stanley Lee has done a service in translating Dr. Blond's work for us, and the publishers have produced a very readable and well-illustrated volume, attractive in appearance and convenient in size.

Notes on Books

In producing an 84-page booklet, *Canteen Catering*, the Ministry of Food has shown forethought in taking into consideration a variety of needs and tastes. A feature of the booklet is its division into sections for (*a*) dishes suitable for England and Wales; (*b*) menus, including broth and black puddings, more acceptable to the Scottish palate; (*c*) light summer meals; (*d*) subsidiary dishes for night workers; (*e*) square meals, easily cooked in an emergency; (*f*) special vegetable recipes; and (*g*) sandwich spreads. Stress is laid on the need for "protective foods" to counteract the deficiency in the average diet, and it is particularly advised that raw vegetables should be used when fruit is deficient. Sound advice is given on the introduction of innovations of this kind: make no sudden change, introduce unfamiliar foods into dishes which are known and liked, serve raw vegetables first as a garnish and gradually increase the quantities to form a salad, and so on. It is pointed out that the catering staff should appreciate the value of the foods served in order that they may help in popularizing them. This valuable book is being distributed free to industrial canteens, British Restaurants, Londoners' Meal Services, and to other large-scale catering organizations. It is also available, price 8d. post free, at H.M. Stationery Office, Kingsway, W.C.2.

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SULPHONAMIDES AND THE NERVOUS SYSTEM

The two most alarming reactions associated with the sulphonamides are agranulocytosis and acute haemolytic anaemia. Toxic effects on the nervous system have, however, been recorded from time to time. Headache is not infrequently encountered, associated in some cases with such diverse symptoms as drowsiness, loss of memory; dizziness, palpitation, paraesthesia, loss of taste, tinnitus, and lack of orientation, while there is evidence to suggest that vomiting may be central rather than peripheral in origin. More serious have been persistent hiccup (Wyman[1]), difficulty in speech, severe abdominal cramps, and in at least a few cases the onset of definite psychoses. A point of importance is that the nervous symptoms may not appear until some days after the withdrawal of the drug. In this connexion it should be remembered that mechanical judgment is often impaired after taking sulphonamide drugs. It is doubtful, for instance, whether any pilot should be allowed to fly for at least four days after taking sulphonamides, while at least one railway accident in which a number of people were injured has been ascribed to the fact that the engine driver was taking sulphanilamide. Still more serious reactions to sulphonamides are the cases of demyelinization of the spinal cord after sulphanilamide, recorded in two patients by Fisher and Gilmour[2] and in one patient after uleron and diseptal B by Schubert.[3] Roseman and Aring[4] also have recently described what at present is a unique case of haemorrhagic encephalitis after the administration of sulphamethylthiazole. This condition, associated with perivascular haemorrhages and in some instances focal perivascular areas of necrosis, is most frequently produced by heavy metal compounds, such as the arsphenamines, and by some of the alkaloids, particularly the opiate group. In the patient who was given sulphamethylthiazole, 112 grammes in six days, both perivascular haemorrhages and focal necroses were present, together with changes in the endothelium of the blood vessels, leading at times to complete occlusion with resulting anoxaemic damage to the neurones: the lesions, however, were found in the grey matter of the cerebral hemispheres and brain stem rather than in the white matter, as is usually the case in typical haemorrhagic encephalitis. Johnstone and Forgacs[5] have in these columns called attention to the fact that symptoms resembling those of meningitis may be produced by sulphapyridine in persons with meningococcal meningitis: in five cases, though the cerebrospinal fluid became quite normal, the symptoms continued or, if the drug was still administered, became intensified; but if therapy was stopped the meningeal symptoms promptly disappeared.

Whereas severe reactions involving the central nervous system have fortunately been extremely rare, those involving the peripheral nervous system have been not infrequent. In 1938 Long and Bliss[6] noted two cases of peripheral neuritis associated with sulphanilamide therapy, but very few instances have been reported. Waugh[7] observed foot-drop in a man who had taken 40 grammes of sulphanilamide in nine days, while Ornsteen and Furst[8] reported toxic neuritis in both lower limbs associated with progressive muscular dystrophy. Albucid has also on rare occasions given rise to peripheral neuritis: in one patient with ulnar neuritis due to this compound Matzdorff[9] found that vitamin B_1 was of considerable value. Peripheral neuritis has not been reported with sulphapyridine, but with disulphanilamide (DB 32, sulphanilyl sulphanilamide), the dimethyl derivative (uleron), the monomethyl derivative, and with sulphamethylthiazole, many cases have now been described, more especially in Germany. With disulphanilamide and its methyl derivatives the distribution of the neuritis is symmetrical, affecting more especially the flexor muscles of the wrists, the interosseous, adductor, and opponens pollicis muscles of the hands, the flexors and occasionally the extensors of the ankle-joints. The paralysis is often of long duration, and an incomplete reaction of degeneration may be given by some of the muscles.

Sciatica may also occur, together with dysaesthesia and disturbances of the autonomic system. Mahoney and his colleagues[10] reported pains and cramps in the muscles of the arms and legs after sulphamethylthiazole therapy, and Brown and Herrell[11] observed three instances of peripheral neuritis among 106 patients treated with this compound. Two cases of nervous involvement after administration of sulphathiazole have been recorded by Bieter and his colleagues[12]: one patient developed foot-drop and deafness in one ear, the other tingling and numbness of the fingers of both hands. No data are yet available for sulphaphenylthiazole and other recently discovered sulphonamide derivatives. A single case of optic neuritis has been recorded by Bucy[13] after sulphanilamide treatment. The sight became defective, and on examination absolute scotomata for red and blue and relative scotomata for white were discovered: the disks were swollen and reddened. After cessation of treatment it took about a month for normal vision to be restored.

The toxic action of the sulphonamides on the nervous system in man has been very fully confirmed by animal experiments. Doses of 1.5 to 2.0 grammes per kilo of body weight given to rabbits were found by Hawking[14] to cause weakness of the legs, dyspnoea, a rigid extension of the limbs and contraction of the head resembling decerebrate rigidity: in a few animals degenerative

[1] *South. med. & surg. J.*, 1938, **100**, 15.
[2] *Lancet*, 1939, **2**, 301.
[3] *Derm. Wschr.*, 1938, **107**, 1361.
[4] *New Engl. J. Med.*, 1941, **224**, 416.
[5] *British Medical Journal*, 1941, **1**, 772.
[6] *The Clinical and Experimental Use of Sulfanilamide, Sulfapyridine and Allied Compounds*. Long, P. H., and Bliss, E. A., 1939, New York.
[7] *Amer. J. Syph.*, 1939, **23**, 745.
[8] *J. Amer. med. Ass.*, 1938, **111**, 2103.
[9] *Klin. Wschr.*, 1939, **18**, 1161.
[10] *Amer. J. Syph.*, 1940, **24**, 613.
[11] *Amer. J. med. Sci.*, 1940, **200**, 618.
[12] *J. Amer. med. Ass.*, 1941, **116**, 2231.
[13] Ibid., 1937, **109**, 1007.
[14] *Lancet*, 1937, **2**, 1019.

changes were present in some of the anterior horn cells of the spinal cord and in some of the cortical neurones. In mice there were incoordination and paralysis. In dogs, sulphanilamide in doses of 1 gramme per kilo produced salivation, vomiting, diarrhoea, hyperpnoea, muscular weakness, ataxia, and, finally, spastic rigidity of the limbs with loss of sensation. Blindness came on, and placing reactions associated with an unimpaired cerebral cortex were absent (Marshall *et al.*[15]). Rosenthal[16] and Nelson[17] also studied the effects of sulphanilamide and disulphanilamide on rabbits and chickens, while more recently Bieter and his colleagues[12] have compared the effects of sulphanilamide, sulphapyridine, sulphathiazole, sulphamethylthiazole, uleron, and sulphaphenylthiazole on chickens, which on the whole are far more sensitive to the sulphonamides than the rabbit or man. Varying degrees of injury to the myelin sheaths of peripheral nerves and to the myelin sheaths and axones of the spinal cord were noted: sulphanilamide and sulphapyridine were found to be the least injurious, followed in ascending order by sulphathiazole, sulphamethylthiazole, uleron, and sulphaphenylthiazole. Under certain conditions, which are at present obscure, and after repeated doses, some accumulation of the drugs occurs in the sciatic nerves.

In view of these effects on the central nervous system the results of the local application of sulphonamides to the brain are of much interest. Russell and Falconer[18] found that local application of solid sulphanilamide and solid sulphapyridine to the rabbit's brain did not cause any appreciable damage, although excess of either substance caused a foreign body reaction. Since sulphanilamide is more soluble than sulphapyridine it is to be preferred for local application. Hurteau[19] also found in cats that the local application of sulphonamides to the brain caused a mild focal leucocytic response which rapidly disappeared from the meninges, while the actual focal reaction was much less than from the implantation of silk sutures or silver clips. The drug could, however, be seen either microscopically or macroscopically in the brain tissues as late as twenty days: chemically, sulphanilamide could be detected up to eleven days, sulphathiazole up to seventeen days, sulphapyridine up to thirty-four days. There was no constant evidence of neuronal destruction or glial reaction from application of drugs to excised wounds of the brain, while the ultimate results of the healing of wounds to which the drugs have been applied does not suggest that they increase the extent of scarring.

INTERRELATIONS OF THE THYROID GLAND

When in 1891 G. R. Murray first successfully treated a case of myxoedema by injections of thyroid extract he not only initiated a rational endocrine therapy but proved that the thyroid was an organ of internal secretion and was not excretory in function, as had previously been believed. We now realize that this gland and other endocrine structures have complicated interrelations, some of which are not easy to interpret. The influence of the anterior pituitary on the thyroid is fairly well defined. The presence of some thyrotrophic principle in the pituitary could be deduced from its tendency to enlarge when thyroid function is depressed, and from the involution of the thyroid which follows ablation of the pituitary in tadpoles and rats. Anterior pituitary extracts cause hypertrophy of thyroid cells even *in vitro*, and that this is an attempt at compensation is shown by the presence of a thyroid-stimulating substance in the blood of thyroidectomized animals and in myxoedematous patients. As for relations with the gonads, it has long been known that the thyroid may enlarge at puberty, menstruation, pregnancy, and the menopause, but the mechanism is not so clear. Oestrone seems to depress thyroid activity, while androgens may stimulate it. From a number of rather confusing observations Marine[1] concludes that thyroid enlargement is most likely to take place at the point in the menstrual cycle when oestrogens are at their lowest level; yet myxoedema is apt to occur at the menopause. It is to be hoped that further research will result in a more consistent story.

The relation between the thyroid and adrenals is complex but more intelligible. It is important to distinguish between cortex and medulla in this connexion. The evidence is that the cortex and the thyroid are antagonistic in action. Indeed the total picture of Graves's disease, with its creatinuria, loss of hair, muscular weakness, achlorhydria, pigmentation, and persistent thymus, implies adrenal cortical insufficiency. On the other hand all recent work supports the original view of Asher and Flack that the thyroid hormone increases the response to adrenaline of the sympathetic nervous system and the tissues innervated by it. Some such interrelation is further indicated because thyroxine and adrenaline are both derivatives of tyrosine and each is a powerful activator of metabolism. In Graves's disease, then, we find antagonism with the cortex and synergism with the medulla of the adrenals. The persistent enlargement of the thymus in Graves's disease is well known, and Hoskins has found that feeding guinea-pigs with thyroid causes the thymus to enlarge. This is a corrective antagonism, for as long ago as 1912 Gudernatsch observed that feeding tadpoles with thymus retarded metamorphosis and offered some protection against the effects of thyroid. Moreover immature animals are less sensitive to thyroxine than adults unless their thymus is removed. Therefore thymectomy, as once recommended for Graves's disease, is clearly contraindicated. Although the independent functions of the thyroid and parathyroids, once fiercely contested, are now universally accepted, it would appear they are complementary in respect of calcium and phosphorus metabolism. Aub has shown that in Graves's disease calcium excretion is greatly increased, while in myxoedema it is decreased. The well-known osteoporosis of the former condition recalls the bony changes of hyperparathyroidism. A considerable but conflicting literature has accumulated on the relation of the various vitamins to thyroid function, but, as Means has pointed

[15] *J. Amer. med. Ass.*, 1938, **110**, 252.
[16] *Publ. Hlth. Rep.*, Wash., 1939, **54**, 95.
[17] Ibid., 1939, **54**, 106.
[18] *Lancet*, 1940, **2**, 100.
[19] *Canad. med. Ass. J.*, 1941, **44**, 352.

[1] *Bull. N.Y. Acad. Med.*, 1939, **15**, 790.

out, there is no evidence that their administration gives appreciable benefit either in Graves's disease or in myxoedema.

In the same journal as Marine's paper there is an interesting and important communication by Lichtwitz[2] on hypothalamic-pituitary syndromes. It supports the views recently expressed in these columns.[3] An observation of some topical interest is that the last twenty-five years have produced a larger number of tall individuals with long limbs and a relatively short torso on which is perched a small head with a long face. In 1930 Harvey Cushing called attention to the increased height of American undergraduates which occurred during his lifetime: whereas when he entered his university only 5% of the students were six feet or more in height, forty years later 20% reached this stature. This points to a change in pituitary-hypothalamic activity, linked with a eunuchoid type. Its somatic characteristics are paralleled by a definite mental pattern. These individuals are emotional rather than rational; they have little stability, lack self-confidence, and dread to assume responsibility. Hence they are easily herded by a man who claims to be their leader and holds out prospects of greatness. It is interesting that in the present Germany this infantile gigantism is portrayed, in the statue of Siegfried, as the ideal of manhood. Here is an evolutionary change fraught with the dangers that beset us to-day.

PENICILLIN: AN ANTISEPTIC OF MICROBIC ORIGIN

We seem to be at the beginning of a new antiseptic era, and not the least promising of the anti-bacterial agents awaiting clinical trial are substances produced by bacteria themselves. Although examples of antagonism between bacteria have been noticed for many years, the thorough investigation of this phenomenon was neglected until the work of Dubos, whose method and results we described briefly not long ago.[4] Starting with a mixture of soils calculated to contain a great variety of bacteria, he fed it for two years with nothing but a particular bacterium, thus selectively breeding out from the original flora those species which could attack and subsist on the bacterium added as pabulum. Thus he isolated a sporing Gram-positive bacillus now recognized as *B. brevis*, which is highly antagonistic to staphylococci and many other Gram-positive bacteria. An extract of this organism proved to be an antiseptic of astonishing potency, not only active *in vitro* but capable, for example, of curing experimental pneumococcal infection in mice. This substance, now known as "gramicidin," has properties well worthy of therapeutic trial. Dubos and Hotchkiss[5] have recently isolated from *B. brevis* another agent, "tyrocidine," which acts also on Gram-negative bacteria but only *in vitro*, and in this and its more toxic properties for mammalian cells rather resembles the older sort of antiseptic.

Another example of antagonism, known for many years, has now been restudied with remarkable results. This story goes back twelve years to the accidental contamination of a plate in Fleming's laboratory by the spore of a mould, a trivial and commonplace occurrence which was to have immense consequences. The original colony of this mould, which proved to be *Penicillium notatum*, inhibited the growth of staphylococci in its vicinity, and fluid cultures of it contained a substance, since known as "penicillin," which was strongly inhibitory to the growth of various mainly Gram-positive bacteria. It came to be used at St. Mary's Hospital and elsewhere as an ingredient in selective culture media, and does not appear to have been considered as possibly useful from any other point of view. The wider possibilities of penicillin have been explored at Oxford by a team of workers directed by Prof. H. W. Florey and E. Chain,[6] who now present an extensive report on their various studies. Earlier observations briefly reported last year suggested that penicillin might be of use as an antiseptic, and the first further step was to provide for its production on an adequate scale. This was not an easy matter, for the larger the scale of cultural work the greater is the risk of contamination, and it appears most unlikely that supplies of penicillin for general use will be available for some time to come. It was found possible to purify the substance to a degree hitherto unattempted and to store it; an arbitrary unit of potency has been adopted, and a simple method devised for assessing potency. The purified product inhibits the growth of *Staphylococcus aureus*, *Streptococcus pyogenes*, and certain other bacteria in a dilution of 1 in 1,000,000 or more. Serum, blood, and pus do not interfere with this effect, and it is exerted on a large as well as a small inoculum, a feature of the action of penicillin in which it is superior, at least in *in vitro* performance, to the sulphonamides. High concentrations relative to those which should be needed to secure antiseptic action were found to be innocuous to leucocytes and to fibroblasts in tissue culture. Penicillin can be given to animals and man intravenously without evident toxic effect, and continuous administration by this route maintains a bacteriostatic concentration in the blood. It is excreted mainly in the urine, but also in the bile and saliva; it was not found in pancreatic juice or cerebrospinal fluid. Acid and the action of insusceptible bacteria destroy it; hence it needs to be protected by alkali if given by the mouth, and is decomposed if given by rectum. The culmination of all these studies was the administration of penicillin by intravenous drip to several cases of staphylococcal pyaemia with evident favourable effect. Given by the mouth with sodium bicarbonate it also served to clear up a staphylococcal infection of the urinary tract; local application to the eye in conjunctivitis was also successful.

These are only the main facts emerging from a very comprehensive study in which a large team of workers is engaged. Laboratory investigations have been carried from every possible aspect to a point amply justifying clinical trial; but the few cases studied—few because the production of penicillin could keep pace with no more—serve only to show that there is one infection at least, and that among the most resistant to all other forms of chemotherapy, which can be favourably influenced even in its gravest form. The list of bacteria susceptible *in vitro* to the action of penicillin is a long one, and includes such various micro-organisms as the meningococcus, the anthrax bacillus, and *Actinomyces hominis*. The wider possibilities of this form of treatment will doubtless be explored as far as possible by the method of local application, if only for the sake of economy in material. Continuous intravenous administration, though consuming large amounts, can be made less wasteful by extracting penicillin from the urine and using it again; that this novel proceeding was actually resorted to and worth while makes it appear that at the moment penicillin is to other antiseptics not unlike what radium is to other metals.

[2] *Bull. N.Y. Acad. Med.*, 1939, **15**, 773.
[3] *British Medical Journal*, 1941, **1**, 755.
[4] Ibid., 1939, **2**, 1193.
[5] *J. exp. Med.*, 1941, **73**, 629.
[6] *Lancet*, 1941, **2**, 177.

FATALITY IN A BLOOD DONOR

Since the outbreak of war thousands of pints of blood have been withdrawn from donors all over the country without the report of any serious mishap. In the majority of cases blood is taken by simple gravity, but in some instances suction is applied to the bottle either by an electric pump, a Higginson syringe, or an electric rotary pump such as was described by Biddle and Langley in 1939 in this *Journal*.[1] Recently a fatal case of air embolism has occurred due to a pump of the latter type reversing its action. An expert from the factory who had made the pump was not aware that such a thing could happen. There was a valve in the pump which was unfortunately out of action due to a piece of foreign matter, but this valve was not placed in the pump for the purpose of preventing such an action but only to stop surges if the pump failed. The pump works on alternating current, and reversal occurs only if the rotor is in a certain position and the pump is switched on from the wall plug and not from the switch on the pump. On the occasion of the disaster, suction had proceeded satisfactorily until an assistant under a misapprehension switched the current off for a moment. The motor of this type of pump can be made safe by the installation of a condenser to prevent reversal. Additional safeguards are a safety valve in the suction current and careful directions as to switching the current. It is hoped that any hospital making use of the rotary suction pump will take steps to have the necessary alterations made in the apparatus. At the moment, when the good will of donors is so essential to the welfare of both Service and civilian casualties, no expense is too great to ensure that the health of the donor is safeguarded.

RECOVERY FROM CRUSH SYNDROME

Respite from air raids has given opportunity to examine more closely the data on the casualties of the winter and spring and to follow more thoroughly the trains of thought that these suggest. The syndrome associated with crush injury occurring in patients buried under the debris of a bombed house has been the point of departure of several hypotheses. On the theory that the syndrome is due not to the liberation of toxic bodies from the crushed tissues into the general circulation but the reverse—loss of blood constituents into the injured limb—Patey and Robertson[2] suggest the use of intermittent positive pressure with a Pavaex apparatus. Of the two cases they treated thus, however, one was already past the danger period (the first week) and the second showed no signs of shock or renal impairment except a few red corpuscles in the urine. The surgical problem of gangrene so often encountered in these crushed patients has also been tackled by using fascia-splitting incisions, on the theory that pressure in deep fascial compartments itself produces tissue damage. This has been made the main subject of an extremely careful and detailed case-study by a group of workers at the London Hospital.[3] Observations were made on the contractility and appearance of the individual muscles exposed by this procedure; biopsy specimens were taken, both at the time and later in the patient's recovery. Two muscles in strong fascial compartments were non-contractile and showed severe necrosis thirty-three hours after release. Other muscles not so confined, though pale and watery, contracted normally and showed only moderate necrosis. This selective damage was thought to be not the direct result of localized trauma but the result of tension inside strong fascial sheaths. This type of intervention is designed to save the limb and prevent ischaemic muscle damage; it may equally increase resorption from already damaged tissue, an action not to be desired if renal damage is due to tissue breakdown products. It has been shown that such substances do enter the blood, and the pigment in the urine of such patients has been identified as myohaemoglobin.[4] As has been more recently pointed out,[5] this was put forward as a possibility as long ago as 1923 by Minami, working on material collected by the Germans during the war of 1914-18. Efforts directed towards combating this systemic result of injury may perhaps be of major importance in the coming winter: comparison of the possible therapeutic value of cortical hormone, alkalinization, and diuretic measures is urgently needed, and will call for thorough observation and unremitting attention if any convincing proof of benefit is to be obtained. In this connexion the case recorded in these columns by R. G. Henderson[6] is of interest: glucose and isotonic sodium sulphate were given intravenously on the seventh and following days. This was followed by diuresis and recovery. A more complete study of a similar case is recorded by Longland and Murray.[7] In spite of potassium citrate (grains 360) by mouth daily from the third day, the urine became alkaline only on the sixth day, but the output increased and recovery ensued despite a blood-urea level of 375 mg. per 100 c.cm. This case was unusual since it presented obvious signs of haemolysis, to which, in the presence of acidosis, the authors ascribe the renal lesion. Further careful studies like this are needed. The mechanism by which the local lesion produces the systemic disturbance (if it does so) must be clarified before we can integrate in any rational way the treatment of the local and that of the systemic condition. This will demand that complete and effective co-operation between surgeon and physician, pathologist and physiologist, which we may hope and expect as one of the few, if indirect, benefits of these unhappy times.

THE SPREAD OF POLIOMYELITIS

The view that human poliomyelitis is a disease of the nervous system alone has never been wholly acceptable either to clinicians or to epidemiologists. Up to a short time ago, however, it was generally held that the epidemiology and pathogenesis of the disease in man were essentially similar to those in monkeys, the usually accepted view (cf. Faber[8]) being based chiefly on the work of Fairbrother and Hurst,[9] who worked with the rhesus monkey *Macaca mulatta*. In this species poliomyelitis appears to be a disease strictly confined to nervous tissues, the only "natural" route of infection being by the olfactory nerves. The view that in man also this was the usual portal of infection was supported by the fact that, from 1911 to 1937 (cf. Kramer *et al.*[10]), of 535 attempts to recover poliomyelitis virus from the nasopharynx of persons either suffering or convalescent from poliomyelitis sixty-four yielded positive results. During the last few years, however, there has been a tendency to look for primary infections of poliomyelitis virus in non-nervous tissues, thus going back to suggestions made many years ago. In 1911

[1] Biddle, E., and Langley, G. F., *British Medical Journal*, 1939, **1**, 555.
[2] *Lancet*, 1941, **1**, 780.
[3] *London Hosp. Gaz.*, 1941, **44**, 126.
[4] *Lancet*, 1941, **1**, 648.
[5] *British Medical Journal*, 1941, **2**, 29.
[6] Ibid., 1941, **2**, 197.
[7] *Lancet*, 1941, **2**, 158.
[8] *Medicine*, 1933, **12**, 83.
[9] *J. Path. Bact.*, 1930, **33**, 17.
[10] *J. exp. Med.*, 1939, **69**, 49.

Lovett and Richardson[11] reported that of 419 cases of poliomyelitis observed from 1908 to 1910, 105, or rather more than 25%, had been swimming, wading, or paddling in more or less heavily contaminated water shortly before the onset of their attack. In 1912 Kling, Petterson, and Wernstedt,[12] working in Stockholm, attempted to isolate the virus by inoculation into monkeys: in this way they claim to have isolated the virus from the intestinal tract of human beings thirty-six times out of fifty. No more passages were made, however, though in 1915 Sawyer[13] obtained one strain of virus from the stools of a convalescent. This was given further monkey passage. Recently, groups of workers in America, Sweden, and France have independently isolated poliomyelitis virus from the faeces, particularly of non-paralytic cases. In Trask, Vignec, and Paul's[14] case the virus was isolated two, eleven, and twenty-five days after onset, while Lépine and Sedallian[15] reported its isolation from the faeces forty-one days after an apparently abortive attack of the disease. On two occasions Paul, Trask, and Gard[16] succeeded in isolating poliomyelitis virus from sewage in cities where the disease was epidemic. These results suggest that at least in non-paralytic cases large quantities of virus are present in the intestinal contents, and that multiplication of the virus takes place in some tissue closely related to the intestinal tract. Burnet and Jackson[17] have recently found that in the monkey *Macacus irus*, infected orally, the mesenteric lymph nodes almost always contain the virus in such large amounts that it could hardly have been conveyed by centrifugal spread along nerves from the central nervous system. Since multiplication within lymph nodes seems unlikely, though it cannot be ruled out, it is probable that the virus increases in and is liberated from some tissue within the field of drainage of the mesenteric lymph nodes, either in the intestinal epithelium or in the associated nervous elements. In any case, however, since virus can pass into the faeces and can contaminate the patient's environment, the question arises of the possible portals of entry of the virus into the body and its method of spread from the portal of entry to the central nervous system. Barber,[18] in an account of an outbreak in a school, was impressed by its resemblance to an outbreak of food-poisoning and suggested that the infection might have been by the gastro-intestinal route. A number of observers (cf. Frey[19]) have drawn attention to the association of trauma and poliomyelitis, and Howitt,[20] Trask and Paul,[21] and others have pointed out that recently isolated strains of the virus readily infect monkeys if injected intradermally. These findings explain the frequency with which, as reported by Leake,[22] children inoculated subcutaneously with partially inactivated virus developed the disease. Thus the skin, if slightly traumatized, may be one point of entry in man. There are other possible portals from which the virus of poliomyelitis may reach the central nervous system. There is already some evidence that instillation into the conjunctival sac may result in infection. Sabin[23] has drawn attention to the tonsil and the possible role of tonsillectomy in providing a portal of entry, and Burnet and Jackson[17] have found that after oral administration the virus can exist at an early stage in the superficial pharyngeal tissues. The findings of these workers after oral administration to *Macacus irus* also serve to confirm the penetration of the intestinal mucosa by the virus of poliomyelitis, a fact originally demonstrated by Kling, Levaditi, and Lépine.[24] How exactly virus reaches the central nervous system from these various possible portals of entry is still not certain. However, the fact that the concentration of virus in the cervical-thoracic vagus and in the sympathetic trunks is high suggests that the autonomic nervous system is responsible for a centripetal spread of the virus.

[11] *Amer. J. Dis. Child.*, 1911, **2**, 369.
[12] *Communications Inst. Méd. Etat*, Stockholm, 1912, **3**, 5.
[13] *Amer. J. trop. Dis. prev. Med.*, 1915, **3**, 164.
[14] *J. Amer. med. Ass.*, 1938, **111**, 6.
[15] *C. r. Acad. Sci.*, Paris, 1939, **208**, 129.
[16] *J. Bact.*, 1940, **39**, 63.
[17] *Austral. J. exp. Biol. med. Sci.*, 1940, **18**, 361.
[18] *British Medical Journal*, 1938, **2**, 1137.
[19] *Schweiz. med. Wschr.*, 1938, **68**, 491.
[20] *Science*, 1937, **85**, 268.
[21] Ibid., 1938, **87**, 44.
[22] *J. Amer. med. Ass.*, 1935, **105**, 2152.
[23] Ibid., 1938, **111**, 605.
[24] *Bull. Acad. Méd.*, Paris, 1929, **102**, 158.

THE I.L.O. IN THE NEW WORLD

The International Labour Office has been rudely uprooted from the lakeside of Geneva and sent across the Atlantic. It had continued its work very much as usual during the first eight months of war, and was planning its annual conference to be held in June of last year. Then Belgium and Holland were invaded, Italy entered the war, and the barricades on the Swiss frontier symbolized its sudden physical and moral isolation from its chief sources of democratic support. Thanks to generous help by the Canadian Government and McGill University, a new working centre was organized in Montreal, and thither by way of Lisbon, the one open port of exit from the Continent, some fifty members of the staff were after various adventures transferred. No sooner had the organization found its feet in the New World than its director, Mr. John G. Winant, resigned on becoming United States Ambassador to Great Britain. His deputy, Mr. E. J. Phelan, an Irishman, is acting director until the governing body can meet to make a permanent appointment. The resignation of Mr. Winant, however, was the occasion for the reaffirmation by thirty-one States of their whole-hearted support of the I.L.O. These States include Great Britain and all its Dominions, nine European countries (all but one of them occupied, and that one Turkey), the United States, and twelve countries of Central and South America. In a pamphlet entitled *The I.L.O. at Work* a pictorial account is given of the organization in its new environment. Its Economic and Social Security Sections are busily at work on studies of the economic and social background of the changes wrought by the war; the Employment Section is engaged on many problems of wartime labour supply and methods of co-operation between Governments and employers' and workers' organizations; and all concerned are re-establishing the I.L.O. as an international clearing house of information on labour questions, social insurance, and industrial health. It is felt that the I.L.O., in spite of the restrictions within which it has to function, can do a great deal to avert or temper the depression which may seize the world after war is over, and to that end it is preparing itself to help in the orderly demobilization of military forces and defence industries and the setting up of a better social structure in the immediate post-war years.

The annual report for 1940 of the research departments of the College of the Pharmaceutical Society shows that they have managed to maintain their activities in spite of evacuation and depletion of their staff. They are to be heartily congratulated on this achievement. Certain problems of special importance in war have been examined: for example, the influence of cooking on the vitamin content of foods, and the relative antiseptic values of acriflavine and proflavine. In addition the departments have continued their routine testing of vitamins, hormones, and certain galenicals.

TREATMENT OF MAXILLO-FACIAL WOUNDS

The following memorandum on the preliminary treatment of maxillo-facial wounds has been issued by the War Office.

Only first-aid treatment is practicable until the patients arrive at the main dressing station, which may be some hours after the receipt of the wound. Early treatment is directed to saving life, the two main aims being to prevent suffocation and to control haemorrhage. General treatment to prevent shock is given by rest, warmth, and sedatives.

Respiratory Obstruction.—As a result of the injury, loss of control of the tongue and/or displacement of bony tissue may occur to such a degree that the air passages become obstructed. Attention should be paid to the possible presence of foreign bodies—for example, fragments of teeth, dentures, etc.—which should be carefully removed. Posture is of vital importance, and the patient should be placed on the stretcher in the prone or semi-prone position to prevent the tongue falling back. If sitting, or if he is able to walk, the wounded man should do so with his head bent forward and downwards. It is most important that stretcher-bearers should be trained in the transportation of men in the prone or semi-prone position (see *R.A.M.C. Training*, 1935, paras. 73 and 86 (i)).

Haemorrhage.—Correct posture will help to control haemorrhage by keeping the tongue forward. Ligature of visible bleeding vessels may be practicable at the advanced dressing station.

Bandaging.—The ordinary four-tailed bandage should never be used unless applied *under* the chin, as it is likely to increase the displacement of the fragments by backward pressure. The "barrel" and "Hamilton" types are very suitable and are easily and rapidly applied. A useful external support is elastoplast—a good grip can be obtained in the shaved temporal areas and the scalp left free. In all cases the bandage should be applied *under* the chin in such a way as to give gentle *upward* support (see *R.A.M.C. Training*, 1935, para. 589, as amended by Amendments No. 4 of 1939).

Preliminary Operative Treatment.—The main dressing station or the casualty clearing station is the first place where a dental officer will be available, and his co-operation and assistance will be sought in every case (see War Office urgent postal telegram 24/General/554, dated June 8, 1940). After due attention has been given to shock, haemorrhage, and respiration, *x*-ray examination (both lateral and antero-posterior) should be made at the earliest opportunity, and the following principles of preliminary operative treatment are recommended.

The operation should be carried out as a rule under general anaesthesia, the surgeon and the dental surgeon working together. The throat should be packed with one piece of 6-inch roll gauze during intratracheal anaesthesia until the jaws are ready for intermaxillary wiring, when the packing should be removed. A long stout stitch may usefully be passed through the dorsum of the tongue and the ends secured. This stitch must not be removed until the reflexes have fully returned after the operation. Owing to mobility of the fragments great care is necessary when manipulating any form of gag. Débridement should definitely be more conservative than in the limbs and trunk, and is seldom necessary.

Injuries to Hard Tissues

(*a*) *Without Loss of Tissue.*—So far as possible accurate apposition of fragments should be carried out. A tooth in the actual line of fracture should be extracted (except when there is only one tooth on the distal fragment and its retention might temporarily assist in control). Fragments carrying teeth should be immobilized by interdental wiring with malleable stainless steel wire. When, in cases of fracture of the mandible, intermaxillary interdental wiring is impossible—for example, where the superior maxilla is edentulous—the principle of maxillary wiring may be adopted. One or more thin stainless steel wires are passed through the alveolar process and looped to furnish fixed points to which the interdentally wired fragments of the mandible can be attached to reduce and immobilize the central fragment. When teeth in the mandible are absent or have been destroyed it may be possible to modify the patient's denture or to use impression composition or gutta-percha moulded inside the mouth, or in a Kingsley splint, to control the fragments.

(*b*) *With Loss of Tissue.*—Only the smallest bony fragments which are completely separated from periosteal attachments should be removed. The main fragments should be fixed in normal occlusion with the opposing jaw. If their ends are exposed they should be covered with mucous membrane by the suturing of mucous membrane to mucous membrane or skin. If necessary any jagged ends of exposed bone may be removed to relieve tension. Even if the whole dental region is lost the molar fragments should be held in normal occlusion. Never allow bone fragments (with intervening loss) to fall together, as great deformity and loss of function will result. Surgical wiring of bone fragments is absolutely contraindicated in *all* compound fractures of the mandible.

Injuries to Soft Tissues (Skin, Muscle, Mucous Membrane)

(*a*) *Without Loss of Tissue.*—Make a careful primary suture with accurate apposition of skin edges, using fine stitches placed as close to the edge of the wound as possible.

(*b*) *With Loss of Tissue.*—Only such primary suture of the wound as can be done *without any tension or closure of the mouth* should be undertaken; thus a loss of one-third of the upper or lower lip, without subjacent fracture, may safely be sutured without detriment to subsequent treatment. It cannot be too strongly impressed upon surgeons that suture of a lip when there is a compound fracture of the mandible should not be attempted until complete control and repositioning of the fragments have been obtained. As a result of the neglect of this rule many cases have been admitted to special centres with an encroachment on the oral opening rendering the subsequent repositioning of the bony fragments extremely difficult. It is far better in these cases to pay all attention to the repositioning of the bone fragments and to leave the suturing of soft tissue and plastic treatment for later attention. In connexion with this, the suture of skin to mucous membrane around the margin of the defect is a procedure of great value in preventing infection and contraction of the soft tissues, either of which will vitiate both hard and soft tissue replacement.

Drainage.—Experience has shown that there is a high frequency of abscess formation after injuries of the lower jaw, and the advisability of providing submandibular drainage at the outset by the insertion of one or more tubes at likely sites should be considered.

Feeding.—The drinking cup with about 3 inches of free rubber tubing is a suitable method of presenting fluid diet well back in the throat.

Mouth Washing.—A solution of sodium bicarbonate is especially recommended as a mouth-wash or for purposes of irrigation in addition to the ordinary antiseptics. The mouth should be irrigated after feeds by means of a Higginson syringe.

Dressings.—Owing to the constant dribbling of saliva in maxillo-facial wounds the dressings are rapidly soaked and frequent changing is necessary. A large jaconet or other waterproof bib should be worn to protect the clothing.

Disposal of Cases.—At the first opportunity the patient should be evacuated to a special maxillo-facial hospital or other hospital where the services of a maxillo-facial team are available.

That the number of practising midwives is diminishing at a time when the calls on the midwifery service are becoming more numerous is an inference to be drawn from the report of the Central Midwives Board for the year ending with March last. There were 64,440 women on the roll of midwives, a net increase of 854 during the twelve months, but only 15,874 had notified their intention to practise during the calendar year 1940, being 1,347 fewer than in 1939 and 1,620 fewer than in 1937, the peak year of the decade. Of the midwives who did make the notification only eleven were untrained "bona-fide" midwives, having been enrolled by virtue of practising before the passing of the Midwives Act. Those entering midwifery practice for the first time during 1940 numbered 1,500. The register of pupil-midwives shows that during that year 2,178 women took the first period of midwifery training and 1,083 the second period. The manner in which the teachers have carried on despite war difficulties is praised in the report; there has been surprisingly little interruption of training.

SERUM RESEARCH IN AUSTRALIA

THE COMMONWEALTH LABORATORIES

[FROM A CORRESPONDENT]

Among the industrial and scientific establishments that have become essential to Australia's war organization are the Commonwealth Serum Laboratories at Royal Park, Melbourne, which are the largest of their kind in the Southern Hemisphere. Since the outbreak of war they have been working at high speed in supplying sera, vaccines, and other biological products for the fighting Services and the civil community, and they now manufacture almost the whole range of biochemical products. For some time the laboratories have been capable of supplying the needs of Australia and its fighting forces over-seas, and recently they were extended to enable them to relieve the United Kingdom of the task of supplying such products to other British possessions bordering the Pacific and Indian Oceans and friendly non-British Powers.

Aim and Work of the Laboratories

The Commonwealth Serum Laboratories were established in the early days of the last war to meet an emergency caused by the cessation of supplies of serum and vaccines from over-seas. They absorbed the earlier Commonwealth Calf Lymph Depot at Royal Park, Melbourne.

A staff of about 300, consisting of graduates in human and veterinary medicine, specially trained in bacteriology and pathology, and highly skilled biochemists, physicists, and botanists, is conducting research into every relevant aspect of bacteriology and immunology. As the growth of medical knowledge opens up new fields of treatment, prevention, and diagnosis, new sera and prophylactic agents are being tested. The livestock population of the laboratories totals many thousands of guinea-pigs, rabbits, mice, rats, horses, cattle, sheep, dogs, donkeys, and bandicoots.

The laboratories are unaffected by constitutional limitations, which restrict Commonwealth action in other phases of public health control in Australia, and in their twenty-five years of existence they have shown a record of steady development, high scientific attainment, and commercial success conspicuous among Government institutions. They now play a part in Australia's national economy for which there is no substitute. The volume of business has steadily increased, and the growing profits are paid into a trust account. It is the policy, however, first to pass on to the public the benefit by way of reduced prices for products, and, secondly, to extend the facilities for research into some of the obscure aspects of this branch of medical treatment. Results have been most encouraging, and have proved the wisdom and soundness of this policy.

It has always been the aim of the laboratories to supply only agents of proven value, uniform in potency, and standardized according to the best technique available. The laboratories have been appointed the national centre for the maintenance in Australia of the standards of the Permanent Commission on Biological Standardization of the League of Nations.

Departmental Products

The department responsible for the production of insulin used in the treatment of diabetics has steadily grown, and the amount of insulin now being regularly issued is very large. Commonwealth pituitary extract is now well established among the practising profession as a sound therapeutic agent, and supplies of the Commonwealth subsidiary standard of pituitary are regularly renewed and checked against the international standard. Thyroid tablets are produced and standardized in terms of thyroxine iodine in accordance with the recommendations of the *British Pharmacopoeia*.

Although the local demand for Jennerian calf lymph for vaccination against small-pox is not great, adequate supplies are constantly maintained in a readily available form to meet any possible epidemic emergency. The vaccine department of the laboratories produces a wide range of vaccines for prevention or treatment of such diseases as cholera and plague, dysentery, gonorrhoea, influenza, whooping-cough, typhoid fever, and coryza, and the streptococcal and staphylococcal infections. In addition this department makes special vaccines to prescription.

Separate departments produce diphtheria and tetanus toxins and also toxoids. The latter are used for the prevention of these diseases in human beings and animals. A special anaerobic department prepares toxin for the production of gas gangrene antitoxin and other sera. In other departments sera are prepared for treatment of many other diseases, including anthrax, dysentery, gonorrhoea, cerebrospinal meningitis, gas gangrene, and pneumonia. Part of the laboratories was recently rebuilt and specially equipped for the investigation of vitamins, and high-grade spectrophotographic and other apparatus are used. Antivenenes for the treatment of snake-bite of the Australian venomous snakes have been the subject of intensive investigation for the last ten years, and antivenene is now available for the most poisonous of the Australian snakes.

A large range of tuberculins is prepared by a special department from human and bovine strains of *M. tuberculosis* for the diagnosis of tuberculosis in human beings and animals. Other preparations from similar organisms are also available. In the allergen department a very large number of special extracts for testing and treatment of hay fever and asthma are prepared.

The media department supplies several hundred different types of bacteriological medium for use by bacteriologists within the Serum Laboratories and in the special departments of hospitals and other institutions throughout Australia. Another special department prepares various agents for the diagnosis of disease as used in the practice of human and veterinary medicine by pathological departments of hospitals, etc. Speaking generally, the work of the laboratories has been a background of scientific research in the fields of bacteriology and biochemistry.

Although, for the last fifteen years, the production of veterinary biological products has been a feature of the work of the laboratories, there has been an extensive development in this direction more recently. The products have been used in greatly increased amounts in all States for the prevention or treatment of disease in domestic animals due to black disease, botulism, tetanus, enterotoxaemia, blackleg, canine distemper, canine tick-poisoning, etc. The care and treatment of many thousands of animals are the responsibility of the veterinary staff.

Activities other than Production

It would be a misconception to regard the Serum Laboratories as an institute solely devoted to the preparation and distribution of biological products. A very large part of the work consists of activities other than production as already indicated. The laboratories do much work as part of the Commonwealth Department of Health, exercising advisory, investigative, and routine functions in a special capacity. In addition, regular annual examinations are held for several grades of officers in the Department. These are compulsory for all of these grades throughout the health service.

For many years, by means of publications of many kinds—independently and in scientific and lay journals—the laboratories have performed an educational service to the community. There is now a considerable and regular issue of articles for publication, embodying the results of original and applied research, which has been extensively developed during recent years.

The Commonwealth Serum Laboratories combine scientific achievement with commercial enterprise in an institution which serves Australia well in time of peace. In time of national emergency it provides a service vital to the civil population and the fighting Services, as well as to those units of the Empire now dependent upon Australia in this respect.

S. Ansbacher (*Science*, 1941, **93**, 164), referring to the work of Woods and Fildes on the anti-sulphanilamide activity of *p*-aminobenzoic acid *in vitro*, presents evidence that the latter is one of the factors in the vitamin B complex. According to his experimental evidence, Ansbacher concludes that *p*-aminobenzoic acid is a chromotrichia factor for the rat and a growth-promoting factor for the chick.

ECONOMY IN LIVER EXTRACTS

The Ministry of Health has issued an Order under the Defence Regulations, limiting, as a wartime measure, the use of liver extracts. The Order provides that liver extracts shall be administered to patients suffering from pernicious anaemia or other megalocytic anaemias only and that such administration shall be only by injection. These restrictions will not apply to preparations manufactured before August 31, 1941.

Until now liver for medicinal preparations has been imported, home supplies being used for food purposes. This has meant the use of shipping refrigeration space which is urgently required for other needs. Further, the preparation of extracts of liver to be taken by mouth involves the use of glycerin and alcohol among other substances, and these, as is well known, are in immense demand for munitions. Fortunately, it is possible to achieve economy in the use of liver extracts without patients suffering any hardship. Liver extract is a specific in the treatment of pernicious anaemia and other megalocytic anaemias only, and it has been proved that by far the most effective and economical way of administering it is by injection. It does not, however, have the same specific effect on the other and much more common forms of anaemia, which can be effectively treated in other ways. Patients, therefore, with other forms of anaemia need not suffer, while at the same time ample supplies of liver will be assured for those who really need it.

Local News

ENGLAND AND WALES

An American Hospital in England

On a site in the South of England a complete field hospital is nearing completion with a total floor area of 3,256 feet by 440 feet. It comprises nine wards, a laboratory, a laundry, a recreation centre, a fully equipped kitchen, a pathological laboratory, and accommodation for full medical and nursing staff, who will be drawn entirely from American volunteers. This is an all-American hospital. Roofs, floors, walls, every bolt and screw, and every bit of interior furniture and equipment have been shipped from America as a gift from the American Red Cross and Harvard University, and their enterprise has established something quite new in building practice. The hospital is of timber construction throughout and it was delivered on to the building site in prefabricated sections all ready for rapid assembly. It has been put together under the supervision of Mr. Gwyer of the American P.H.C. Corporation without the aid of plans and detail drawings because these failed to reach this country. It is estimated that, employing thirty men with a knowledge of this system of construction, a hospital of this size could be completely assembled and equipped in less than twenty-five weeks. The hospital incorporates a mobile field unit. Dr. John E. Gordon, professor of preventive medicine and epidemiology at Harvard University, is director of the hospital, and the medical staff have all been supplied by Harvard University.

Bristol Hospitals Fund

Two years ago the voluntary hospitals of Bristol, in a concerted effort to stop the large deficits which appeared annually in their individual balance sheets, launched their own contributory scheme—the Bristol Hospitals Fund. In spite of the war and of gloomy prognostications based on the fact that Bristol already had several independent contributory schemes, the fund has collected £33,000 for hospitals and auxiliary services. Its annual revenue is between £25,000 and £30,000, and its membership—still growing—is 18,000. Still more encouraging is the proposal, announced by Mr. Egbert Cadbury at a recent meeting of the Bristol Hospitals Fund, to start an "intermediate contributory scheme," the admitted object of which is not only to provide for a section of the community whose income falls within certain defined limits, but also to secure some payment for specialist and consultant services in addition to cost of maintenance. The B.M.A. scale fixing the limit of income for free medical and surgical attention is to be observed by all Bristol voluntary hospitals—that is, the upper limit will be £312 a year for a married person with dependants, £260 for a married person without children, and £208 a year for a single person without dependants. The Bristol Hospital Fund's new scheme is for persons with incomes just above these figures—that is, for married persons with dependants and an income of not more than £416, married persons without dependants and an income of not more than £364, and single persons without dependants with an income up to £260. For a payment of 6d. a week (26s. a year) they will be entitled to full hospital services, including those of specialists and consultants. The scheme will apply to all the voluntary hospitals in Bristol except the Bristol Eye Hospital, where a specially modified scale of fees is payable.

Reports of Societies

PATHOLOGICAL MISCELLANY

About sixty members and guests attended a meeting of the Association of Clinical Pathologists on July 19 at Cambridge, when a number of short communications were made.

Acute Pancreatitis.—Dr. J. F. GASKELL described seven cases of fatal acute pancreatitis in Cambridge between 1932 and 1934. The patients had been in vigorous health, but death occurred within a few hours of onset, in several cases shortly after a full meal. At necropsy, done usually within twenty-four hours, acute haemorrhagic and even necrotic pancreatitis, apparently of ante-mortem origin, was found. No association between the cases could be traced and no significant micro-organisms were found. In one case a man died on the football field, the suggestion being that the head of the pancreas had been squeezed against the spine by another player's knees.

Serum for Transfusion.—Drs. G. A. HARRISON and L. E. R. PICKEN demonstrated the preparation of blood serum for transfusion. Ordinary dry blood bottles were used and about 47% yield of serum was obtained. The resultant serum remained clear at room temperature. Among 102 transfusions pyrexia with rigor occurred once and without rigor four times. On the assumption that the body contained 10 pints of blood and that a haemorrhage of 6 pints was the largest compatible with survival, the maximum amount of serum that could be required even in the worst cases would be 3 pints—that is, half of the volume of blood lost. In most transfusions one bottle of serum had been given. Defibrinated blood was also prepared: 30 c.cm. of glass beads shaken in the blood gave good defibrination. If the blood were not used the serum could be recovered later.

Dr. I. N. GREAVES demonstrated the attractive Cambridge plant for vacuum-freezing drying of serum or plasma. Plasma was dried in the sterile bottle in bulk, or spun so that a readily soluble layer of dried serum adhered to the inner walls of the bottle.

Blood Groups.—Drs. G. L. TAYLOR, R. R. RACE, and Prof. R. A. FISHER showed figures amplifying those published in *Nature* in April, 1940. The proto-Scandinavian abundance of the O phenotype in blood groups as one progressed from South England north to North-West Scotland was clear in the large figures now available from blood transfusion centres, the totals nearing 150,000. For O and A groups the percentage figures for South England were 45 and 43, for North England 48 and 40, for Scotland 52 and 34.

Glandular Fever.—Dr. A. M. BARRETT gave details of technique in deciding titre in the Paul-Bunnell test for glandular fever. Horse red cells, he said, gave a somewhat higher titre than sheep cells. Of 100 normal human sera none agglutinated sheep cells at 1 in 80, 4 gave a titre of 1 in 80 or slightly higher with horse cells. Of 27 cases of glandular fever 17 gave a titre of 1 in 640 or slightly less with sheep cells: 10 had a higher titre. With horse cells 11 gave 1 in 640 or less, and 16 showed

a higher titre. The slight titre in normal sera could be abolished by absorption with Forssman antigen (guinea-pig kidney), whereas ox cells would absorb the true glandular fever haemagglutinin. Dr. S. C. DYKE showed curves of blood counts during glandular fever. The rise in the total white cells might not start for about a week; it reached in the average case about 18,000 per c.mm. at three weeks, dropped to 9,000 at seven weeks, with a temporary secondary rise to 19,000 at about ten weeks. This curve ran parallel to the eosinophil curve, since it was the eosinophil increase that mainly caused the leucocytosis. During the early reduction or absence of eosinophil cells, eosinophil granules might be found in the polymorphoneutrophils. There was swelling of the eyelids in every case.

Poliomyelitis.—Dr. SINCLAIR MILLER suggested that, as general lymphoid hyperplasia occurred in poliomyelitis and swelling of Peyer's patches was associated with the passage of virus in the faeces, the textbook description of poliomyelitis as an exclusively or predominantly neurotropic virus was insufficient.

Glycosuria.—Dr. F. B. SMITH described glucose-tolerance tests in 57 recruits referred for "glycosuria." Only 1 had diabetes mellitus; 23 had no glycosuria; 29 had renal glycosuria compatible with full activity and good health; and 36 gave a peak response in the tolerance test, with return to normal in one and a half to two hours. Dr. Smith was inclined, for capillary blood, to accept a maximum of 180 to 190 mg., and even 200 mg., per 100 c.cm. if the return to normal took place under two hours.

Tuberculosis.—Dr. C. H. WHITTLE discussed some variations in response to tuberculous infections. Five types were described. Purulent cerebrospinal fluid from acute fatal meningitis in an Indian student showed large numbers of acid-fast bacilli. A boy of 4, afebrile and in good health, was found at operation for hernia to have his peritoneum studded with active tubercles containing acid-fast bacilli. A case of Bazin's disease, one of papulo-necrotic tuberculide, and one of Schaumann's disease were described with biopsies and tuberculin reactions.

Media for Diphtheria Bacilli.—Dr. A. W. DOWNIE described a modified tellurite blood agar medium for diphtheria bacilli. Hedley-Wright agar with 1.0% of Turner's peptone formed the bottom layer of the plate; the top layer of agar contained 5% horse blood and 0.04% potassium tellurite. The addition of 0.75 to 1.0% of Evans bacteriological peptone (or bacto- or difco-proteose peptone) yielded larger *mitis* and *gravis* colonies. Of 488 swabs from new cases, contacts, convalescent and carrier cases, Loeffler plates were positive and tellurite negative in from 2 to 3%, whereas in from 15 to 37% in different groups tellurite plates alone gave positive results.

Haematology.—Dr. L. B. COLE demonstrated a macrocytic anaemia in a baby 4 weeks old, with rapid response to anahaemin. Dr. F. B. SMITH showed 4 cases of ovalocytosis in one family (one patient suffered from pernicious anaemia); and Dr. C. H. WHITTLE sections of benign lymphogranulomatosis in a woman.

Clostridia.—Miss NANCY HAYWARD demonstrated the use of the Nagler reaction for the rapid identification of *Cl. welchii* (Hayward, N. J., *British Medical Journal*, 1941, **1**, 811). The reactions of strong and weak toxin-producing strains of *Cl. welchii*, feebly reacting non-*welchii* cultures, and other non-reacting anaerobes were shown both in tubes and on plates. The growth from wound swabs on Nagler plates and on blood plates were compared. In plates containing serum *Cl. welchii* produced a Nagler opacity; if the plate contained a small amount of antitoxin the opacity did not appear. Dr. SCHWABACHER said that *Cl. tertium* would grow as a facultative aerobe. This was often forgotten, despite the work of Hall and Dufforth (*J. Bact.*, 1935, **29**, 269). By means of surface viable counts colonies of *Cl. tertium* were found to grow in air, in 5% CO_2, under micro-aerophilic and anaerobic conditions, the intensity of growth increasing in this order. The organism was shown sporing when grown anaerobically and as a Gram-negative bacillus when cultivated in air.

The second American Congress on Obstetrics and Gynaecology will be held at St. Louis, Missouri, from April 6 to 10, 1942. Further information may be obtained from the Chicago office of the Congress, 650, Rush Street.

Correspondence

Describing Hypochlorite Solutions in Treatment of Burns

SIR,—In view of the importance of avoiding confusion in the treatment of burns with hypochlorite solutions, it seems desirable that users of this treatment should take real care in describing the composition of the solutions employed. The dangerous practice of describing a 2.5% dilution of a 1% solution of sodium hypochlorite as "2.5% electrolytic hypochlorite" (Bunyan, *Proc. roy. Soc. Med.*, 1940, **34**, 27) has already been criticized by Mr. Lunn (*Journal*, July 26, p. 136) and has been amended by Commander Bunyan (July 5, p. 3) in his proposal to use the term E.S.H. for a 1% solution of electrolytic sodium hypochlorite. But even now it seems undesirable to use the term "5% E.S.H." to mean a solution of 0.05% electrolytic sodium hypochlorite, since the consequences to the patient of the mistaken use of a solution of 100 times the correct strength might be disastrous.

There is further danger in the lack of definition by various authors of the sodium chloride content and *p*H of their solutions of hypochlorite. These factors may be of clinical importance at least as great as the hypochlorite content, especially when solutions are used such as "milton," which when undiluted is said to contain 16.5% of sodium chloride. All danger of confusion would be avoided if authors were to state early in their papers the content of their stock solution in hypochlorite and in sodium chloride, and the approximate *p*H. Authors could then refer to dilutions of this solution as "5% of stock solution" and so on, thus admitting of no ambiguity.—I am, etc.,

National Institute for Medical Research, Hampstead, N.W.3, Aug. 20. R. B. BOURDILLON.

Neurosis or Psychosis?

SIR,—The perennial debate as to the distinguishability of neuroses and psychoses is certainly wearisome, but it remains fundamental. Unlike Captain Tredgold, experience with the psychiatric disorders of soldiers has impressed on me both the usefulness and the general ease with which a distinction between endogenous and reactive types of depression may be made. There are, it seems to me, two common fallacies which are not always avoided by disputants on this theme. One is in essence the old logical trap which faces one when asked to say how many stones make a heap. If we were to be troubled in this way in physical medicine we might be tempted to doubt the existence of diabetes mellitus as a pathological entity. The other fault frequently committed is a forgetfulness of the fact that psychiatric disorders have a long time-span, frequently extending over the whole of the life. We may be puzzled at any one instant of time to say whether a condition belongs to one or another class, and yet find ourselves in no such difficulty were we able to know the whole past and future life of the patient. Upholders of the belief in a distinction between "neurotic" and "psychotic" types of depression have allowed themselves to be side-tracked by preoccupation with clinical minutiae, such as the presence or absence of insight. We should rather attempt to evaluate the biological qualities of the illness, as it occurs in its setting of personality make-up and constitution as revealed by family history. If we were to adopt such an attitude, we would no longer be inclined to regard the characteristic phasic disturbance of the manic-depressive and the depressive systems shown almost universally by any sick human being as the polar extremes of the same syndrome.—I am, etc.,

Sutton, Surrey, Aug. 18. ELIOT SLATER.

Activity of Tuberculosis

SIR,—The clear-cut definition of such useful terms as "activity," "allergy," and "toxaemia" (which are apt to become woolly not only at the edges) is long overdue; I should like, if I may, to accept Dr. Lawrence Roberts's challenge in his letter (August 16, p. 245) to define "activity," and set the ball rolling.

I submit that the presence of "activity" is to be deduced only when there are evidences of tissue destruction. The amount of tissue destruction can be measured by means of the sedimentin index and expressed numerically in units: the higher the index the greater the amount of tissue destruction. Healthy young

adult males show indices varying from 0.53 unit to 0.74 unit, with an average of 0.65 unit. Active pulmonary tuberculosis causes indices to rise to anywhere between 0.95 unit and 2.70 units. (The average patient admitted to this sanatorium shows an index of 1.70 units.) Rarely as a result of treatment is the index reduced to less than 1.0 unit: but an index of 1.15 seems to be compatible with good symptomatic health and a full day's work. If in addition the lesions continue to regress the index will improve still further.

If a patient had a T.B.-positive sputum and no evidences of tissue destruction (i.e., an index within normal limits) his bacilli would be entirely saprophytic and perfect symbiosis would exist between them and him. Without any tissue destruction he would be providing them with a home and a culture medium in which to breed. Such a condition obtains with various other organisms, and is therefore presumably theoretically possible with the tubercle bacillus.

But I have yet to meet the man with a positive sputum and a normal index.—I am, etc.,

Vale Royal Abbey, Cheshire, Aug. 17. GEORGE DAY.

Active Pulmonary Tuberculosis: A Definition

SIR,—In your issue of August 16 (p. 245) Dr. Lawrence Roberts quotes two types of case of pulmonary tuberculosis, and implies that I would class patients in the first type as carriers of the disease. I must disclaim all responsibility for this statement, which is a great surprise to me. I cannot help feeling that Dr. Roberts has misunderstood my meaning, but I do not think that this was my fault, as Dr. Wright, in the same issue, has obviously understood what I wished to convey.

The original purpose of my paper was to make the profession "tubercle-conscious," and it was directed chiefly to those members of the profession who, in the course of their routine work, inevitably meet individuals who are coughing up tubercle bacilli and infecting others. The suggestion was that if those practitioners cared to have sputum examined in every possible case they would meet with some surprising results, and they might well encounter many cases which were infectious and yet which were not suffering from pulmonary tuberculosis. After all, it was only a suggestion, and as such capable of verification, so that there is little point in criticizing the hypothesis until the material which I indicated has been examined.

The discussion has, however, shifted in a direction which I did not foresee, and a definition of active pulmonary tuberculosis is asked for. This is by no means easy. Pulmonary tuberculosis presents itself in an astonishing variety of ways, but for a diagnosis of active disease there must obviously be symptoms and/or signs (in the wide sense, including pathological evidence). The symptoms and signs may be either those of toxaemia or those of a lesion in the lung. Toxaemia, together with evidence of a tuberculous lung lesion, is almost conclusive of active pulmonary tuberculosis. What many people do not recognize is that symptoms and signs of the local lesion are not so conclusive: haemoptysis, for instance, may continue for years after the lesion has become arrested, usually in such cases being associated with fibrosis and bronchiectasis. The physical signs in the chest are rarely conclusive, although persistent crepitations and pleural friction are usually good evidence. In the same way a single *x*-ray is universally admitted to be misleading at times, and so, I maintain, is the sputum. I would define active pulmonary tuberculosis as "a tuberculous lesion in the lung which is considered to be responsible for toxaemia or which can be shown on serial skiagrams to be altering." It does not matter in which direction *x*-ray changes occur, for evidence of improvement is proof that the lesion is, or has recently been, active.

I gather that Dr. Fraenkel advocates the treatment of all sputum-positive cases until they become sputum-negative. This appeals to me most strongly, but how is it to be achieved?—I am, etc.,

London, W.1, Aug. 18. JAMES MAXWELL.

Chemotherapy in Middle-ear Disease

SIR,—I had assumed that the leading article recently published in your columns had brought to an end the discussion on chemotherapy in acute otitis media. The article by Major C. A. Hutchinson (August 2, p. 159) revives the subject, fortunately, I think, in view of its practical clinical importance. Dr. Jessiman's opening contribution[1] showed considerable enthusiasm for chemotherapy, though the cases quoted by him appeared to show an infection unusually mild or a diagnosis open to doubt. Later contributors have expressed an appreciation of the value of chemotherapy, but have entered so many caveats and suggested such possibilities that one is left with the impression that while lip-service is paid to the method its value is in fact discounted.

Great emphasis has been placed upon preliminary bacteriological examinations of specimens from the middle ear or nasopharynx. Is this necessary? Is this another case where treatment must wait upon the laboratory? It may be that sulphanilamide, sulphapyridine, and sulphathiazole are not mere specifics for streptococci, pneumococci, and staphylococci, but that each is more polyvalent than its predecessor. Prof. Fleming[2] recently adduced evidence suggesting the latter possibility. The time should soon arrive when there is general agreement on this important point: it has not yet been reached.

My own practice is to regard the bacteriological examination of these cases as not compensating for the time consumed (nor for the possible expense to the patient). My usual prescription is sulphapyridine in adults, one gramme every four hours as a minimum. This, free fluids, confinement to bed, local palliatives, and appropriate surgery for suppuration when localized are the essentials of treatment.

More important, however, is the suggestion repeatedly made by your correspondents that chemotherapy fogs the clinical picture or masks a mastoiditis (Hutchinson[3]). I cannot agree that the cases described by the last author are, in fact, cases of masked mastoiditis, unless all cases are to be so described which do not present the old-fashioned and elementary features—pyrexia, mastoid tenderness, and mastoid swelling. Nor has it been shown that chemotherapy was responsible for the course of the disease in the cases quoted by this and other writers. How commonly we saw cases such as those described before the days of chemotherapy! As students we were taught the dangers of antipyretics—relieving symptoms, lowering a perhaps useful rise in temperature, yet leaving the disease untouched. But all the evidence shows that the chemotherapeutic agents under discussion do not act in this way; they are not palliatives, are not antitoxic, but are anti-bacterial.

Chemotherapy may well make otology more difficult; the patient being tided over an acute and spreading infection, the decision to operate for a residual infection may become necessary—a decision requiring judgment, but surely not more than competent otology can provide. And the greater difficulty for the otologist does not counterbalance the advantage to the patient: operation for a localized and not a spreading infection—how desirable elsewhere in the body, how equally desirable in the middle-ear tract!

Altered spheres of activity since the outbreak of war make recent comparisons difficult; in any case the Army should not be a fertile field for mastoid surgery. But I do not forget that in the twelve months before the outbreak of war mastoid operations performed by me were some 40% less than the fairly steady average of the ten preceding years. These twelve months saw chemotherapy (largely sulphanilamide) in extensive use. The lowered incidence of mastoid operations could perhaps in part be explained by the prevalence of streptococci of relatively low virulence (as suggested by T. B. Layton), but chemotherapy was in my opinion an important factor. This practice of chemotherapy and decrease in operations were not accompanied by any increase in complications; the reverse was the case, I believe, but I am writing without access to the records. There occur to me two cases admitted (without previous chemotherapy) of otitis media with meningitis, each showing a turbid C.S.F. with streptococci both in smears and on culture. Both were treated with sulphanilamide; one, occurring early in an acute suppurative otitis media, had no operative treatment of any sort; the other, occurring later in the disease, had a Schwartze mastoid operation; both cleared up completely.

Chemotherapy is of great value in acute suppurative otitis media and its extensions in the early stages and when extension is threatened. It will tend to prevent spread of infection, but it will not cause resolution of a suppuration which has localized. It lessens in no way the need for careful and skilled observation of every case of acute suppurative otitis media; it lessens in no way the truth of the statement that in acute suppurative otitis

media discharge persisting unduly long has a mastoid or naso-pharyngeal cause which *must* be cleared up, by operation if necessary, if permanent tympanic damage or serious complications are to be avoided. Failure to perform myringotomy or mastoid operation when indicated is negligence; failure to employ chemotherapy when indicated is also a disservice to the patient.—I am, etc.,

Aug. 6. T. A. CLARKE, T/Major, R.A.M.C.

REFERENCES

[1] Jessiman, J. B., *British Medical Journal*, 1941, **1**, 399.
[2] Hutchinson, C. A., ibid., **2**, 159.
[3] Fleming, A., *Proc. roy. Soc. Med.*, 1941, **34**, 342.

SIR,—Dr. J. B. Jessiman's (March 15, p. 399) article interested me not so much by its optimistic note as by the many patients whose acute otitis media was secondary to scarlet fever. I found that sulphapyridine given in half the dosage recommended brought the temperatures of children suffering from scarlet fever and measles to normal within a few days, and those who were seen early did not develop otitis media. The few who had otalgia when first seen did not have distended drums, and their pains disappeared in twenty-four to forty-eight hours. Similar results were noticed in patients suffering from or likely to suffer from symptoms of otitis media secondary to sinusitis, tonsillitis, endemic parotitis, dental extraction, teething, pertussis, naso-pharyngeal operations, and kindred ailments.

I agree with Major C. A. Hutchinson (August 2, p. 159) that too much reliance should not be placed on the sulphonamides, but not that sulphapyridine should be replaced by sulphanilamide in streptococcal infections. The dosage and variety of sulphonamide should depend on the age, sex, idiosyncrasy, and complaint of the patient, and the course of the condition.

A man aged 35 was suffering from acute pain in the right ear. This was associated with right antral, sphenoidal, and tonsillar infection. The drum was distended and oedematous. Myringotomy immediately relieved the pain: 0.5 gramme of sulphapyridine was given three times a day for three days. Clear blood-stained serum, usually associated with streptococcal infection, escaped from the curved myringotomy incision. No secondary infection occurred with pneumococci or staphylococci and the drum was dry on the fourth day. He returned to work in ten days and has had no return of symptoms.

The following three cases may also be of interest.

A boy aged 2 years, with a history of suppurative otitis media for fourteen days, had creamy pus coming from the right ear and cloudy pus from the left. A quarter of a 0.5-gramme tablet of sulphapyridine was given three times a day for a week, half a tablet was given twice a day for the second week, and a quarter daily for the third and fourth weeks. The left ear was dry at the end of the second week and the right at the end of the fourth week.

A boy aged 2 years had had spasmodic torticollis on the left side of three months' duration. There were injection, thickening, and loss of light reflex of the left drum. This was associated with loss of appetite and poor health. There was also a left antral infection and chronic rhinorrhoea. A quarter of a tablet was given three times a day for the first week and twice daily for the second and third weeks. The rhinorrhoea had now ceased, the appetite returned, and the thickened and retracted drum was less injected. The spasmodic torticollis was now only pronounced when on his mother's right arm. Nebulae ephedrin. (ephedrine grain 1/4, liq. paraffin ad 1 oz.) with guttae ac. carbolici were continued for two months, when recovery took place.

A youth aged 18 had had a discharging ear for three months. Offensive cholesteatomatous material was removed when syringed: 0.5 gramme of sulphapyridine was given three times a day for three weeks, when the ear was dry and a clean healthy perforation remained.—I am, etc.,

Burley, Leeds, August 11. L. C. LODGE.

Severe Reaction after Sulphapyridine

SIR,—Quite apart from the fact that a definite diagnosis has not been made in the case here recorded, the interesting feature is the intense reaction following reinstitution of therapy with sulphapyridine. The presumption is, of course, that the patient has become sensitized to it.

The patient, a woman aged 60, had eight weeks ago become suddenly ill with malaise and fever. On the second day of her illness she became covered with a scarlatiniform rash, which disappeared after twenty-four hours. She was febrile at this time, but there was no sore throat. The fever continued, and therapy with sulphapyridine was started. She was given 0.5 gramme at four-hourly intervals for six days—a total of 18 grammes. Fever still persisted, and after a lapse of three days treatment with sulphathiazole was instituted. She was given three tablets every four hours for three days. During the time she was taking sulphapyridine she felt very ill and vomited three to four times daily. Sulphathiazole therapy produced similar symptoms, but they were not so bad. At the end of this time—that is, four weeks ago—the patient was still febrile and has remained so ever since.

During the last week she has been given pentnucleotide 10 c.cm. every other day for four doses, in the hope that it might improve the polymorphonuclear count (see below). After the fourth dose I thought that another course of sulphapyridine might help to get rid of the fever. The patient felt well at 7 a.m.; temperature 99°. One tablet was given at 8 a.m. At 8.30 a.m. she vomited and felt very ill. At 9 a.m. she had a rigor and another at 10 a.m. Temperature rose to 104°. No more sulphapyridine was given, and her condition gradually improved during the day.

On examination the only physical sign she presented was an indescribable bruit—pericardial—which occurred in diastole over the pulmonary area. Blood culture and the urine were sterile. Agglutination reactions, repeated twice, for *B. typhosus*, paratyphoid A and B, and *Br. abortus* were negative. A blood count showed 30% haemoglobin, 1,700,000 red cells per 100 c.cm., colour index 0.9. The white cells numbered 2,100; lymphocytes 79%, polymorphs 21%.

The patient's past history is of interest. At birth she is said to have been a "blue baby," which is a possible explanation of the heart murmur. Three years ago she had a septic finger followed by a staphylococcal septicaemia, from which she recovered with difficulty. She had lobar pneumonia one year ago, when she responded well to sulphapyridine.—I am, etc.,

Tenbury Wells, July 19. J. A. BURNETT, M.R.C.S.

Abortus Fever and Sulphapyridine

SIR,—In your issue of August 9 (p. 210) Dr. J. Whittingdale writes of the treatment of a case of abortus fever with sulphapyridine. If I interpret the case report correctly, the patient had approximately fourteen days of fever, on the last two of which he was given sulphapyridine. Since then Dr. Whittingdale has noted an afebrile phase of about ten days before sitting down to pen an enthusiastic eulogy of "our newest bactericide," which tempts him into the unequivocal and forthright title for his letter of "*Brucella abortus* Infection responds to Sulphapyridine" (I presume that is his own choice).

It may well be, of course, that the patient concerned has remained afebrile since Dr. Whittingdale wrote his letter, but it is surely misleading to record as an apparent cure, after so short a time of observation, a case of a disease which is notorious for its intermissions and relapses.

Our opportunities for studying this interesting disease at first hand are necessarily limited. A recent case of my own has been under observation in all for rather over one hundred days. In that time there have been three febrile phases lasting approximately 10, 14, and 4 days, but the intermission periods which have punctuated these have been 20 and 28 days, and, up to the present time, a further 28 days have passed since the last phase. I am not yet able to say that a point of cure has been reached. The illness has been entirely symptomless except for sweats and temperature and the usual concomitant features during the bouts of fever. There have been no joint or muscle pains and no splenic enlargement. The agglutination titre for *Brucella abortus* was 1:500. Sulphapyridine was given during the second and third febrile phases in doses of 0.5 gramme four-hourly except when the patient was asleep. As to its effect one can only speculate. The course of the fever in the second stage did not show any material difference from that of the first, in which sulphapyridine was not used, and actually the second stage lasted longer. Treatment in the second stage did not prevent a further relapse after twenty-eight days, and, though the subsequent recurrence of temperature was not prolonged, that fact cannot necessarily be attributed to sulphapyridine, which in this case certainly failed to achieve any dramatic result

comparable to the effect in other conditions—for example, pneumonia. Abortus fever is so capricious in its behaviour that one cannot with certainty say how much its course is influenced by treatment or how much by the natural rise and fall of the infection itself.

One point of interest is the possible effect of sulphapyridine on the blood picture, which is normally leucopenic in this condition. My own case showed 3,800 white cells per c.mm. after the first course of sulphapyridine, with polymorphs 40% and lymphocytes 51%. If prolonged treatment with sulphapyridine should become necessary in this type of case, the double strain on the granulocytes—one from the disease and the other from treatment—must be considered.

Most of us in general practice must see from time to time, especially in children, febrile illnesses some of which are unrecognized cases of abortus fever. The temptation to give sulphapyridine to pyrexias of doubtful origin is obviously great, and at times may seem justified by results. It is impracticable to take blood specimens either for counts or for agglutination tests in all cases. We thus do a double disservice—first to the patient in treating, without adequate control, pyrexia with leucocytosis in the same way as pyrexia with leucopenia; and, secondly, to both the patient and scientific truth (also important) in obscuring the nature of a pyrexia before establishing a diagnosis. Indiscriminate use of sulphanilamide, sulphapyridine, and sulphathiazole is as great a fault as masking the acute abdomen with morphine.

May I add that I shall be happy to hear at some future date that Dr. Whittingdale's case has not belied his enthusiasm for "our new weapon," or that the "target" which he has shot to pieces has not suddenly popped up again. The more recorded experiences of abortus fever and the treatment thereof with sulphapyridine the better.—I am, etc.,

Boston, Lincs, Aug. 13. J. H. F. PANKHURST, M.D., D.P.H.

Haemorrhage in Sulphonamide Therapy

SIR,—I was interested to read Dr. Crawley's memorandum (August 2, p. 160), in which he described intestinal haemorrhage complicating sulphonamide therapy in two cases of meningococcal meningitis.

In his first case, before being certain that the drug was the cause of the symptom, the question of haemorrhage into the adrenals should, I think, be considered. Nelson Carey (*Ann. intern. Med.*, 1940, **13**, 1740) calls attention to this complication of septicaemia, and states that it is most often associated with the meningococcus. He states also that the condition usually occurs in children and may be recognized by collapse, cyanosis, accelerated respiratory rate, low blood pressure, vomiting, and purpura during the course of the initial illness. The leucocyte count is high. Heinle (*Arch. intern. Med.*, 1939, **63**, 575) reports massive haemorrhage into the adrenals in patients dying of acute meningococcal septicaemia, who may also have haematemesis, melaena, and extensive purpura. In Dr. Crawley's first case adrenal haemorrhage rather than the drug seems, I think, to have been a more likely cause of the melaena and sudden death. It would be most interesting to know if a post-mortem was performed and whether there were any blood-pressure readings.

In his second case, although the evidence is far more suggestive of the drug's causing the melaena, another possible explanation is an acute peptic ulcer occurring during the course of the infection. Although I have on occasion seen haematuria as a complication of the sulphonamides, I have not come across melaena during extensive use of the drugs in both meningococcal and other cases in the last two years.—I am, etc.,

C. ASTLEY CLARKE, M.D., M.R.C.P.,
Aug. 6. Surg. Lieut.-Commander, R.N.V.R.

Medical Planning

SIR,—May I be allowed to congratulate Dr. Douglas Boyd on his letter (August 2, p. 179). His statement on the attitude of the profession towards medical politics tallies exactly with my own. The crying need of the moment is not a blue-print of the future, which not even the Government can foresee, but to achieve unity among ourselves. There is great uneasiness among the rank and file, but instead of looking to the B.M.A. for a lead each man is trying to provide for his own security—G.P.s are hurriedly taking up factory appointments and consultants are seeking addresses elsewhere "for the convenience of their patients who have been evacuated." The *sauve-qui-peut* momentum is increasing and will become a Gadarene stampede when the men now on service come home.

The movement for unity should have preceded the Planning Commission, and it may be now too late, but therein lies the only hope of averting the disruption of the profession. No confidence is placed in the assurance that the findings of the Commission will be submitted to the Divisions for final approval, the general feeling being that whatever they may be they will have to be accepted as the quickest way out of an intolerable state of things, and that any disagreement will receive scant consideration. At present the B.M.A. has no adequate machinery for finding out what the wishes of its own constituents are, even if it wished to, and there is a considerable body of medical opinion altogether outside the fold.

If the B.M.A. wishes to put its own house in order before the deluge, it should begin by establishing close contact with the periphery, and this can only be done, in my opinion, through whole-time paid officials in each Division or group of Divisions. The average G.P. has no time, and is generally too tired, to devote his leisure to accounts and clerical work, still less to travel considerable distances to attend arid business meetings. A paid representative would take all this off him, would arrange short *ad hoc* meetings, or would ascertain the views of his Division by personal visits. After which he should be in a position to keep his Division in constant touch with headquarters by frequent visits to London—say, once a month. In this way provincial members at least would get a great deal more for their money than a building in London which few contrive to visit more than once or twice in their careers. Personal contact with a representative would go a long way towards recovering the lost prestige of the B.M.A. among members and non-members. Under existing arrangements a Divisional secretary has few opportunities of making such contacts.

Another urgent requirement is for an effective voice to be found for dissentient opinion. Among 36,000 medical men there is bound to be opposition to any policy, and it is no answer to say that the Divisional Representative can come to London under the existing arrangements to give tongue to it. It is not at all easy to find a representative in a small Division—few men are accustomed to public speaking, many lack self-confidence, and all lack time. Nevertheless, their dissent may be both strong and reasonable. Such men drift first into sullenness, then into apathy, and lastly into defection. Can the B.M.A. envisage this situation with complacency?

Desperate needs call for desperate measures. Can the B.M.A. realize that the need is desperate and urgent? Or will it still continue to act as though the G.P. were not capable of knowing which side his bread was buttered? Mere additions to an already top-heavy Commission will not meet the case.—I am, etc.,

C. J. STOCKER,
Cannon Hill, Lancaster, Aug. 4. Lieut.-Col., I.M.S. (ret.).

The National Loaf

SIR,—Dr. Griffith Evans (August 9, p. 212) is hopelessly at sea in regard to the subject under discussion. He is evidently mixing up the national wheatmeal loaf, which is not fortified, and against which I have never expressed an adverse opinion, with the white loaf, which I believe in some parts of the country is fortified with one vitamin and nothing else. It is the unfortified loaf which is rich in vitamins, etc., and not the fortified loaf. From the letter of your correspondent it would appear as though my criticism had been concerned with the national wheatmeal loaf. I never said that the loaf was fortified with calcium alone. It is certainly not a fact, as stated by your correspondent, that "calcium is added in the form of phosphates." Calcium is not added in any form to the fortified loaf; but so far as the original proposal in regard to this substance is concerned I should like to refer him to the various memoranda of the M.R.C.

Bad teeth are common among all sections of the community, but they certainly have nothing to do with calcium deficiency (see our paper in this *Journal*). In regard to vitamin D, etc., the point is this. The only evidence which is said to point to a calcium deficiency is a rare disease called "osteoporosis." This condition is now generally recognized to be due to vitamin D

deficiency. It follows, therefore, that there is a vitamin D deficiency somewhere in our diet. My criticism solely concerned the original proposal to add calcium to flour. We know now, from a recent statement by Major Lloyd George, that the fortified loaf does not contain added calcium. I have now no adverse comments to make on the bread policy of the Government.—I am, etc.,

Liverpool, Aug. 15. I. HARRIS.

Obituary

C. A. SCOTT RIDOUT, M.S., F.R.C.S.

The passing of the distinguished Portsmouth surgeon, Mr. Charles Archibald Scott Ridout, has cast a gloom over all who knew him.

He was born in 1875 at the Royal Naval Hospital, Stonehouse, Plymouth; his father, Staff-Surgeon Charles Lyon Ridout, R.N., was on the staff there, and later served in H.M.S. *Tourmaline*, East Indies, and died at Mauritius of malarial fever. His mother was Ada Purley, daughter of Archibald Scott of Halifax, Nova Scotia. When a small boy he began his education at Plymouth College, and from there he went on in 1887 to Sherborne School, where he remained six years; the environment of this school remained his Mecca to the end of his life. In 1894 he proceeded to St. Bartholomew's, and qualified in 1899, obtaining the M.S.Lond. in 1903, and the F.R.C.S. in 1904. Several house appointments followed—at Bart's, North Stafford Infirmary, and the Royal Hospital at Portsmouth. He was destined to become a surgeon and a hospital man, eventually holding the position of senior surgeon at the Royal Portsmouth Hospital and the Portsmouth and Southern Counties Eye and Ear Hospital. At the latter hospital, which he dearly loved, he accomplished some of his best work over a period of thirty-three years. His influence for its extension was all-prevailing, and so it was meet that his memorial service, which was very largely attended, should have been held at the Cathedral of old Portsmouth, in the immediate vicinity of that hospital. He also held other surgical appointments, and was president of the Laryngological Section of the Royal Society of Medicine in 1937-9, and a vice-president of the Section of Laryngology and Otology of the British Medical Association in 1924. He was a strong advocate of the B.M.A., serving as secretary of the Portsmouth Division and president of the Southern Branch, and local general secretary for the Annual Meeting at Portsmouth in 1923.

Surgeon Rear-Admiral R. J. MCKEOWN, O.B.E., R.N. (ret.), writes:

In the midst of such a strenuous life it might reasonably be thought he had few spare moments, but Charles Ridout readily accepted the chairmanship of the Local Medical War Committee, Portsmouth, in March, 1939, and carried through with success the scheme for the "Protection of Practices," which safeguards the practices of his colleagues who have volunteered or been called up for the defence Forces. He organized two clinical meetings yearly, which were always successful and much appreciated by his colleagues. He was extremely patriotic, and during the last war served as surgical specialist and surgical divisional officer, with the rank of major, R.A.M.C., in the 29th Stationary Hospital at Salonika (1916-17), and in Italy (1917-19). His principal hobbies were those which might be expected of a man with his vigorous mind—motoring, fishing in Scotland, and rugger; in fact, nowhere was he happier than when running up and down the touchline encouraging the first XV, in which his eldest son played, at his old school, and for many years he attended the university and international matches at Twickenham.

Nature bestowed on him some of her finest gifts: a keen intellect, great powers of physical endurance, and infinite patience. In the operating theatre, perhaps, was to see him at his best, so ably exercising his masterly skill with the lightest touch, never perturbed by any unforeseen complication (for which the remedy was immediately forthcoming); sympathy and kindness for one and all, especially for his child patients and their anxious parents. No wonder that his name became a household word with rich and poor alike; and so, when his health began to fail some months ago, his many friends were gravely anxious and distressed. But he carried on as usual until an operation became imperative in June last, from which he made a hopeful recovery, and his complete restoration was anticipated, but, alas! a fatal relapse frustrated these hopes. On the domestic side of his life he was a devoted husband and good father, taking the liveliest interest in the careers of his children—one of his sons a soldier who was present at Dunkirk; his second son, a surgeon lieutenant R.N.V.R., present at the naval engagement at Narvik; and a daughter now following in her father's footsteps as a medical student. He was buried at Sherborne after cremation at Southampton, and to his widow and children is extended the deepest sympathy. Truly it may be said of Charles Ridout, "Well done, thou good and faithful servant; enter into rest after toil."

J. JAMESON EVANS, M.D., F.R.C.S.

We regret to announce the death of Mr. J. Jameson Evans on August 13 at Aberdovey. He was for many years surgeon to the Birmingham and Midland Eye Hospital and had been president of the Midland Ophthalmological Society and the Midland Medical Society.

Born at Carmarthen in 1871, John Jameson Evans was educated at St. David's College School, Lampeter, and Queen Elizabeth's Grammar School, Carmarthen, and after a distinguished student career at the University of Edinburgh, graduated M.B. and C.M. with honours in 1892. He took the M.R.C.S. and L.R.C.P. diplomas in 1897, the F.R.C.S.Eng. in 1899, and the M.D. degree of Birmingham University in 1903. His first appointment was as house-surgeon to the Carmarthenshire Infirmary; in 1897 he began his long association with the Birmingham and Midland Eye Hospital as resident surgical officer. After three years he was appointed honorary ophthalmic surgeon, and continued to serve in that capacity till 1934, when he became consulting surgeon.

Mr. Jameson Evans had been for many years consulting ophthalmic surgeon to the Birmingham General Dispensary and ophthalmic surgeon to the Royal Institution for the Blind, Edgbaston, to the Hallam Hospital, West Bromwich, and to the Bromsgrove Hospital. He was Middlemore lecturer in 1899. During the last war he served as ophthalmic surgeon to the 1st and 2nd Birmingham War Hospitals. At the Annual Meeting of the British Medical Association in Birmingham in 1911 he held office as honorary secretary of the Section of Ophthalmology, and at the Centenary Meeting in London in 1932 he was vice-president of the same Section. He was the author of *Notes on Ophthalmology for Students* and contributed articles on diseases of the eye to this and other journals. He had been vice-president of the Ophthalmological Society of the United Kingdom. He served on the council of the Oxford Ophthalmological Congress, of which he was a foundation member, for nineteen years, and held the position of lecturer in ophthalmology in the University of Birmingham for twenty-five years.

Mr. Jameson Evans leaves a widow, the second daughter of the late Principal Edwards of Aberystwyth, and two sons, both of whom are engaged in medical practice.

Mr. HARRISON BUTLER writes:

The unexpected death of Mr. J. Jameson Evans after a very short illness has come as a blow to his colleagues in Birmingham and to his many friends and patients. It was my privilege to work with him for eighteen years as a colleague on the staff of the Birmingham Eye Hospital, and naturally I learned to know him very well, to respect him, and to love him. We sat on the same day at adjoining desks, and became thoroughly acquainted with each other's views and work. I look back upon those years as among the happiest of my life. Never was there the slightest semblance of friction between us, and never have I

seen Evans lose his temper or utter a cross word. He always had a happy smile and a pleasant witticism for everybody. His courteous treatment of the patients was an example to all. Even during the last war, when three out of the six surgeons were on active service and we were always short of good house-surgeons, he was unruffled, efficient, and helpful. Pathology was Evans's strong suit. For many years in his early days at the hospital he made himself responsible for this branch of the work, and he became quite enthusiastic over any unusual condition. He was an outstanding ophthalmoscopist and his judgment was unerring. Although he never seemed to read much, he always knew all about current literature. I think that his active brain soaked up facts and theories with the facility of a sponge; he learned without difficulty, and retained all the knowledge that he acquired. His death leaves a gap that cannot be filled. His friends called him "Sunny Jim," and that exactly describes the man.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

The returns for England and Wales show a substantial decline in the incidence of the common infectious diseases. The numbers of notifications of whooping-cough, measles, diphtheria, and scarlet fever were 638, 246, 94, and 32 fewer, respectively, than in the preceding week. In Scotland an increase has been recorded, and the cases of scarlet fever, diphtheria, and whooping-cough increased by 8, 78, and 18 respectively.

Typhoid and Paratyphoid Fevers

The increase in the number of cases of typhoid in England and Wales, 34 as compared with 24 in the previous week, was due to isolated cases over a wide area; eight more counties were involved than in the past week. The decline of the local outbreak in Cheshire and Lancashire—25 and 96 cases were reported from these counties as compared with 43 and 133 of a week ago—was responsible for the large decrease in the number of notifications of paratyphoid. The incidence remains high in Liverpool C.B., and, with 70 cases, this city accounts for over one-third of the total for the country. In Scotland only 13 cases were recorded, against 33 of the previous week.

Dysentery

The outbreak in Brecknock M.B. has apparently subsided, only 1 case being reported this week against 69 last week. The experience of three counties accounted for over one-half of the total cases reported in England and Wales; the remainder were distributed over twenty counties. The principal outbreaks were those of Essex, 13, of which 12 were reported from Colchester M.B.; Lancaster, 19, of which 11 were contributed by Blackburn R.D.; Suffolk East, where the whole of the 37 cases occurred in Leiston cum Sizewell U.D. In Scotland 52 cases occurred during the week, the largest outbreaks being those of Lanark County 13, Aberdeen County 9, and the Burghs of Dundee 10 and Glasgow 8.

Cerebrospinal Fever

Cerebrospinal fever showed a slight increase during the week; 19 more cases were notified in England and Wales than in the preceding week. The disease was widespread, over thirty counties reporting its presence. The largest outbreaks were those of Lancaster 26, West Riding of Yorkshire 20, and London 12. An increase of 5 was reported from Scotland. Glasgow, with 15 cases, accounted for over one-third of the total cases notified.

Acute Poliomyelitis

Although the number of cases reported in England and Wales was only 1 less than in the preceding week, only ten counties were involved as compared with seventeen counties in the previous week. The counties of Berkshire and Buckinghamshire, with 8 cases each, were responsible for over half the cases recorded in the country. The opening of the elementary and secondary schools in a large area of South Buckinghamshire has been postponed until further notice because of the outbreak. Individual districts with multiple cases were: Berkshire (Maidenhead M.B. 6); Buckinghamshire (Slough M.B. 3, Eton R.D. 3, Wycombe R.D. 2); Lincolnshire (N. Kesteven R.D. 2). Nine cases were reported from Scotland, an increase of 2 upon last week's number. Multiple cases were notified from Edinburgh 3, Lanark County 2, and Glasgow 2.

No. 31

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended August 2.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1941					1940 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	166	12	39	8	9	142	14	29	1	5
Deaths		2	1				3	2		
Diphtheria	727	31	204	25	38	814	28	275	24	24
Deaths	26	2	—	3	1	13	—	11	1	—
Dysentery	122	7	52		—	42	2	54		—
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	5	—	2	1	—	2	—	—	—	—
Deaths		—	—				—	—		
Enteric (typhoid) fever*	34	—	1	5	3	119	3	10	7	5
Deaths	—	—	—	1	—	1	—	1	—	—
Erysipelas		—	42	6	5		13	33	2	1
Deaths		—	—				—	1		
Infective enteritis or diarrhoea under 2 years										
Deaths	34	4	5	15	2	29	7	10	10	4
Measles	3,084	101	42	143	1	9,312	39	647	—	11
Deaths	4	—	—	1	—	6	—	8	1	—
Ophthalmia neonatorum	86	3	18	2	—	85	4	23	—	—
Deaths										
Paratyphoid A and B.	194	—	13	—	—					
Deaths	—	—	—	—	—					
Pneumonia, influenzal†	424	11	13	—	—	425	17	4	2	3
Deaths	4	—	—	1	3	11	—	2	1	—
Pneumonia, primary			124	12				107	8	
Deaths		—		8	—		15		4	7
Polio-encephalitis, acute	5	—				8	—			
Deaths		—					—			
Poliomyelitis, acute	28	—	9	2	—	25	1	2	—	—
Deaths		—	—				—	—		
Puerperal fever	1	1	18	5	—	2	2	10	—	—
Deaths		—					—			
Puerperal pyrexia	135	9	12		—	144	13	9		—
Deaths										
Relapsing fever	—	—			—	1	—			—
Deaths										
Scarlet fever	863	38	107	36	18	1,502	42	144	39	43
Deaths	1	—	—	—	—	3	—	—	1	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	3,731	251	59	63	5	818	5	41	—	13
Deaths	22	2	4	2	—	2	—	1	4	2
Deaths (0–1 year)	229	23	46	51	19	282	37	53	26	29
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	3,596	513	573	190	113	4,039	635	583	168	134
Annual death rate per 1,000 persons living			12.5	12.6	‡			11.8	11.2	11.7
Live births	4,518	331	796	354	202	5,811	936	807	373	221
Annual rate per 1,000 persons living			16.2	23.5	‡			16.3	24.9	19.4
Stillbirths	191	24	27			248	32	33		
Rate per 1,000 total births (including stillborn)			33					39		

* Includes paratyphoid A and B for Eire and Northern Ireland.

† Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

‡ Owing to evacuation schemes and other movements of population, the birth and death rates for Northern Ireland are no longer available.

The Services

NAVAL AWARD

The O.B.E. has been awarded to Surgeon Commander Edward Hefferman, R.N., for bravery and devotion to duty in boarding a burning merchantman during an enemy air attack.

ARMY AWARD

The Military Cross has been awarded to Captain Robert Norman Lees, R.A.M.C., in recognition of gallant and distinguished services in the Middle East.

CASUALTIES IN THE MEDICAL SERVICES

ROYAL ARMY MEDICAL CORPS

Prisoners of War

War Substantive Captain Wilfred R. Crowe.
War Substantive Captain Nicolas Shtetinin Seaford.
War Substantive Captain Malcolm Montgomery Wallis.
War Substantive Captain Richard Mallorie Wiltshire.
Lieut. Archibald Leman Cochrane.

Medical News

Dried separated milk powder, rich in protein and therefore of special value for children, may now be purchased in bulk from the Ministry of Food by school canteens, residential schools, and hostels, and Circular 1561 of the Board of Education explains how this should be done. The allowance of the powder is 1 oz. a day for each child. It is also announced that industrial undertakings which supply milk as a beverage to their workers should apply to local Food Offices for permits to continue this practice, as provision is to be made in the milk distribution scheme for the supply of milk for this purpose.

The Privy Council has appointed Dr. G. Roche Lynch lecturer in chemical pathology, St. Mary's Hospital, and senior official analyst to the Home Office, to be present at the examinations held by the Pharmaceutical Society.

A medal was recently presented to Dr. Maurice Roch by the Société Médicale de Genève on the occasion of the twentieth anniversary of his professorship of clinical medicine at Geneva.

Dr. J. Alejandro Téllier has been appointed Director-General of Health in Bolivia.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

At a Congregation held on August 2 the following medical and surgical degrees were conferred:

M.D.—*K. Vigors Earle, E. D. Hoare, R. H. Dobbs.

M.B., B.CHIR.—*R. M. Archer, *E. D. Barlow, *D. V. Bateman, *R. I. S. Bayliss, S. L. Binderman, *P. T. Boyle, *K. F. C. Brown, *E. D. H. Cowen, *D. Currie, B. Dansie, *R. Daley, *J. O. W. Dick, *W. M. M. Douglass, *J. R. Ellis, *R. M. Evans, J. Foley, *R. B. Franks, *R. E. A. S. Hansen, *D. V. Harris, *A. Holmes-Smith, *F. H. Howarth, *E. W. Hyde, G. T. James, *R. K. I. Kennedy, *E. F. Laidlaw, J. M. Lipscomb, *J. F. Lucey, *G. M. Lunn, *F. N. Macnamara, *O. D. Macnamara, *A. E. de la Tour Mallett, *R. Martlew, G. A. Mott, J. M. Mungavin, *H. H. Nixon, *J. F. North, *M. S. M. Palmer, *G. H. Parkinson, *A. G. E. Pearse, *John Perrin, *M. T. Pheils, *G. E. Pinkerton, G. K. Riddoch, *K. B. Rooke, *R. D. Scott, C. G. R. Sell, *A. W. Simmins, *A. G. Stansfield, *D. E. Thompson, *A. J. H. Tomlinson, *J. G. Thurston, *A. B. Unwin, *A. H. Widdup, *J. M. Willcox, *A. B. Kinnier Wilson, C. H. Wood, *W. B. Young.

* By proxy.

UNIVERSITY OF LONDON

King's College Hospital Medical School

Upon the results of recent examinations, awards have been made as follows:

Senior Scholarship for Clinical Studies: R. A. Moir, King's College Hospital Medical School.

Anatomy and Physiology Scholarship: J. R. M. Miller, King's College, London.

Pathology Exhibition: V. H. Wheble, Brasenose College, Oxford.

Science Scholarship: P. C. Harris, St. Olave's Grammar School, London, S.E.

UNIVERSITY OF GLASGOW

A series of eight postgraduate meetings will be held in the Tennent Institute of Ophthalmology on Wednesdays from September 10 to October 29 at 8 p.m. The subjects of the addresses will include: postgraduate tuition in ophthalmology, the making of the ophthalmic specialist, ophthalmic practice in retrospect, the future of ophthalmic practice, pros and cons in ophthalmic therapeutics, ophthalmology in the law courts, and the problem of the nearly blind. There will be opportunity for informal discussion.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

Authors desiring REPRINTS of their articles must communicate with the Secretary, B.M.A House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS should be addressed to the Advertisement Manager (hours 9 a.m. to 5 p.m.). Orders for copies of the *Journal* and subscriptions should be addressed to the Secretary.

TELEPHONE NO.—B.M.A. and *B.M.J.*: EUSTON 2111.

TELEGRAPHIC ADDRESSES.—EDITOR, *Aitiology Westcent, London;* SECRETARY, *Medisecra Westcent, London.*

B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

QUERIES AND ANSWERS

Timepiece for Blind Person

Mr. N. BISHOP HARMAN writes in reply to " Inquirer " (August 16, p. 254): The most pleasant timepiece for the blind is a " repeater," either a carriage clock or a watch. Pressure on the button on the case causes a striking of the hour and half-hour. There are special watches made for the blind, with " hunter " cases, and face with raised metal figures and strong hands. The time is told by feeling the face. If cost be a consideration, the simplest plan is to get a five-shilling clock, remove the glass front, and put small blobs of sealing-wax on III, VI, IX, and XII. Anyone can tell the time by feeling the position of the hands of the clock, and without any sight.

E. H. C. writes: A relation of mine, blind from his youth, used an ordinary " hunter " watch with the glass removed, and he could tell the time by feeling the hands. Possibly, however, as the lady has only recently become blind, she may have difficulty in acquiring sufficient delicacy of touch for the employment of this method. If means permit, the obvious solution is the purchase of a watch or a small travelling clock that repeats hours, quarter-hours, and minutes, but I fancy the cost of such an article would be in the neighbourhood of £100. It might be worth advertising for a second-hand one.

LETTERS, NOTES, ETC.

Medical Unit for Ethiopia

Dr. ANDREW MORLAND writes: In response to a request from the British Administration in Ethiopia, the Friends Ambulance Unit is shortly sending to that country a medical unit of forty men. The need for medical personnel in Ethiopia is greater than ever, and it is anticipated that the F.A.U. will assist in the more elementary forms of medical treatment. It is also thought likely that they will be called upon to train native dressers in this work. The work of the unit will be under the supervision of the Director of Medical Services, but its value would be greatly increased by the inclusion of qualified doctors. Their presence would also be cordially welcomed by the Administration as well as by the natives of Ethiopia, whose medical needs have been so greatly accentuated by the recent fighting. Any medical man wishing to offer his services in this direction should write to the Secretary, F.A.U., 4, Gordon Square, London, W.C.1.

Convalescent Poliomyelitis Serum

Drs. SINCLAIR MILLER and STANLEY WRAY write from Duchy House Clinic, Harrogate: We have available a moderate supply of convalescent poliomyelitis serum for use in conjunction with sulphapyridine, and would be willing to forward a limited quantity on request.